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An Exploratory Study on the Impact of Real-Time Score Feedback on Stress, Risk-Taking, and Enjoyment in Competitive Bridge Players

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Abstract

This study examined the psychological effects of real-time performance feedback on stress, risk-taking, and enjoyment in competitive contract bridge. Unlike many sports where scores are continuously visible, bridge typically provides only delayed results, offering a unique opportunity to test whether immediate feedback disrupts psychological states in a cognitively demanding, non-physical competition. Forty-eight players participated in either a feedback condition, where they received live score updates after each board, or a no-feedback condition, where scores were revealed only after play concluded. A multivariate analysis of covariance (MANCOVA), with nationality as a covariate, showed no significant overall effect of condition on stress, risk-taking, and enjoyment. These results indicate that, contrary to expectations, the introduction of real-time score updates did not significantly alter players' stress levels, risk-taking behavior, or enjoyment compared to delayed feedback. This research contributes to the broader literature on distractions by extending investigations from athletic contexts into strategic, mentally intensive environments.

Keywords: bridge, performance feedback, distraction, stress, risk-taking, enjoyment

The Impact of Real-Time Score Feedback on Stress, Risk-Taking, and Enjoyment in Competitive Bridge Players

Bridge is a complex and intellectually demanding card game that requires high levels of mental concentration, memory, strategic foresight, and cooperation. At every stage of the game, players must recall the bidding patterns of each participant and the sequence of cards played in order to gather information and form hypotheses about the distribution of the cards, which changes with each play (Smith & Hartley, 1990; Keren, 1987). Success in bridge relies not only on individual reasoning but also on coordination with a partner, making it a highly strategic and cognitively intensive competition.

A unique feature of bridge is that players typically do not receive ongoing updates about their performance. Unlike in most sports, where scores are continuously visible and directly influence athletes' strategies in real time, bridge results are usually revealed only after an entire match or session has been completed. This norm of delayed performance feedback means that players remain unaware of their relative standing while playing, even though they may form internal judgments based on their perception of performance.

This delayed feedback structure makes bridge a particularly suitable context for examining the role of real-time (versus delayed) performance feedback in competitive environments. Performing well in a competition often depends on maintaining task focus rather than being distracted by factors such as scores, which in many sports act as a primary source of pressure and distraction. Bridge therefore provides a unique opportunity to test whether the introduction of real-time score updates – into a setting where such information is normally absent – alters player's psychological experience. Specifically, the present study investigates whether immediate score updates influence level of stress, risk-taking behavior, and enjoyment in competitive bridge.

Real-time versus delayed performance feedback

Bridge is distinctive in that players usually remain unaware of their standing until the match has concluded. Live score updates are not part of the game's traditional structure, meaning performance feedback is typically delayed. This norm allows players to remain immersed in gameplay, relying on memory, probability estimation, and strategic reasoning without the distraction of continuous evaluation. In this way, delayed feedback helps preserve focus on the unfolding play rather than on outcomes.

By contrast, in most competitive sports, players are continuously exposed to real-time feedback about their performance through visible scorelines or time remaining. This evaluative information enables athletes to adapt their strategies on the spot but can also heighten psychological pressure, distract, and influence emotional states. Research in football, for example, has shown that teams often adopt more conservative strategies when leading and take greater risks when trailing, highlighting the direct impact of score visibility on both decision-making and motivation (Redwood-Brown et al., 2012; Lago-Peñas & Gómez-López, 2014; Furley et al., 2023). Such findings demonstrate how continuous performance information can shape both tactics and the psychological experiences of players.

Introducing real-time score updates into bridge therefore represents a notable departure from established practice. Continuous performance feedback may shift attention away from the task itself toward the implications of current standings, potentially increasing stress, altering risk preferences, or undermining enjoyment.

By comparing players who received immediate score updates with those who received delayed feedback only after the match, the research investigates whether the timing of performance feedback influences players' psychological experiences - specifically their reported levels of stress, risk-taking, and enjoyment during competitive play.

Stress

Stress is a central psychological factor in competitive performance. It encompasses both cognitive anxiety (worry, rumination, and self-evaluative thoughts) and somatic tension (physiological arousal such as muscle tightness or restlessness), both of which can interfere with concentration and decision-making. In sports contexts, stress often arises from time pressure, uncertainty, and performance evaluation. Research demonstrates that stress significantly impairs athletic performance and health outcomes, with professional athletes reporting decreases in training and competitive achievements under high stress (Natsir et al., 2021).

One important way in which performance feedback can influence players' experiences is through evaluative pressure. Under evaluative stress, attention is diverted away from task performance and toward self-monitoring, leaving fewer cognitive resources available for effective decision-making. Keogh and French (2001), for instance, demonstrated that high test-anxious individuals under evaluation-related stress were more susceptible to distraction, particularly during tasks requiring focused attention. Applied to competitive bridge, real-time score visibility can be seen as a continuous form of evaluative stress, where players are constantly reminded of their standing and thus more likely to experience worry, tension, and distraction from the task itself.

By contrast, delayed feedback shields players from ongoing evaluation, allowing them to keep their focus on the task without the immediate burden of performance comparisons. Since bridge players are accustomed to delayed results, the sudden introduction of real-time score updates represents a novel stressor that is expected to elevate both cognitive and somatic anxiety during play.

Therefore, *Hypothesis 1a* states that relative to players who do not receive immediate feedback, players who receive real-time score updates will report higher levels of stress after the match**.**

Risk-Taking

Risk-taking is a central behavioral dimension in competitive settings, referring to the tendency to adopt bold or unconventional strategies that involve greater potential gains but also higher chances of failure. In sports, situational factors such as scorelines and time pressure often influence players' willingness to take risks. For example, football teams that are trailing often adopt more aggressive strategies, while those in the lead may play more conservatively to protect their advantage (Lago-Peñas & Gómez-López, 2014). Such findings highlight that the visibility of scores and standings can shape decision-making by altering the perceived balance between potential rewards and risks.

Different research in high-stakes competitions confirms this pattern. Genakos and Pagliero (2012) examined professionals competing in dynamic tournaments and found that interim rank significantly influenced strategic behavior: players trailing just behind the leaders increased their risk-taking, while those closer to the top underperformed despite stronger incentives. Similarly, Jane (2023) analyzed NBA basketball games and showed that interim performance information directly affected shooting decisions. Players who were trailing engaged in riskier attempts, while those leading tended to adopt more cautious strategies, illustrating the psychological effects of real-time evaluative feedback.

Applied to bridge, these dynamics suggest that introducing real-time score updates may increase players' willingness to take risks during play. The continuous awareness of one's standing can create a sense of pressure to adjust strategies more aggressively, leading to less stable and more risk-seeking decision-making compared to situations where feedback is delayed until after the match.

Therefore, *Hypothesis 1b* states that relative to players who do not receive immediate feedback, players who receive real-time score updates will report greater risk-taking behavior.

Enjoyment

Enjoyment is a central component of intrinsic motivation and reflects the extent to which an activity is experienced as inherently rewarding and satisfying. In competitive contexts, enjoyment is not only tied to performance outcomes but also to the subjective quality of the experience itself - whether players feel engaged, immersed, and motivated to continue. Enjoyment is often greatest when individuals can remain fully immersed in the task, feel autonomy in their actions, and evaluate their performance in a holistic way after the activity, rather than being continuously monitored or compared to others.

In games such as bridge, where performance is highly cognitive and feedback is typically delayed, players may find greater enjoyment because they can remain absorbed in the strategic demands of the task. Introducing immediate score feedback, however, changes this dynamic. Introducing immediate score feedback, however, may reduce enjoyment by drawing attention away from the intrinsic aspects of play and toward external comparisons and rankings. When players focus more on their standing than on the activity itself, the satisfaction of problem-solving, teamwork, and successful strategy may be diminished.

By contrast, delayed feedback allows players to complete the game without this distraction, encouraging them to evaluate their experience more calmly and holistically after the match. This reflection may support higher levels of enjoyment.

Therefore, *Hypothesis 1c* states that relative to players who do not receive immediate feedback, players who receive real-time score updates will report lower levels of enjoyment.

Methods

Participants

This convenience sample comprised 48 bridge players. Of these, 26 were in the feedback condition (who received live score updates during play), and 22 were in the no-feedback condition (who did not). Participants were recruited through the researcher's personal network, via online platforms such as Facebook and bridge forums, and at in-person

bridge events including the Youth Teams World Championship held in Salsomaggiore Terme, Italy, from July 12 to 17, 2025. Participants were assigned to groups based on availability and suitability for online or in-person match settings. No compensation was provided for participation.

Participants were eligible if they were active bridge players, gave consent to participate in the study and finished the questionnaire. No other inclusion or exclusion criteria were applied. Of the 55 initially recruited participants, one was excluded for not providing consent, and six were excluded for not completing the questionnaire, yielding a final sample of 48. The sample consisted of 38 males (79.2%), 9 females (18.8%), and 1 participant who preferred not to disclose their gender. The no-feedback group included 20 males and 2 females; the feedback group included 18 males, 7 females, and 1 participant who did not disclose their gender. Participants ranged in age from 16 to 46 years (M = 22.67, SD = 5.17). Participants in the real-time feedback condition (M = 20.77 years, SD = 3.99) were younger on average than those in the delayed feedback condition (M = 24.91 years, SD = 5.57). In terms of nationality, most participants were Polish. In the feedback group, 92.3% identified as Polish (n = 24), with one participant identifying as Dutch and one as Serbian. In the no-feedback group, 50% were Polish (n = 11), while the remaining participants identified as Dutch (n = 1), English (n = 4), Swedish (n = 3), Serbian (n = 1), Norwegian (n = 1), and Chinese (n = 1). Most participants reported competing at the international (n = 25) or national (n = 14) level, with a few playing at the regional (n = 4), local (n = 3), or purely casual (n = 2) level. Years of bridge experience varied from 1.8 to 18 years (M = 8.88, SD = 4.34), with responses such as “approximately 10 years” or “almost 6 years” converted to approximate numerical values where appropriate.

The study protocol was approved by the Ethics Committee of the Faculty of Behavioural and Social Sciences at the University of Groningen via the fast-track procedure.

Procedure and Design

Participants were informed that the study aimed to explore gameplay experiences but were not made aware of the specific manipulation (i.e., live score feedback) until debriefing. They completed a self-report questionnaire via Qualtrics, which assessed cognitive and emotional experiences during bridge play. The questionnaire was available in English and Polish, and participants selected their preferred language before beginning. It was completed shortly after the bridge match, depending on participants' availability and setting, either online or in person using the same digital format. In all cases, informed consent was obtained prior to participation. At the end of the questionnaire, participants were provided with a brief debriefing and contact information for follow-up.

The independent variable was the presence of live score feedback during the bridge match. The study employed a between-subjects experimental design with two conditions: a feedback group, in which participants received live score updates during play, and a no-feedback group, in which no real-time scores were provided.

Participants were not randomly assigned to conditions. Instead, group allocation was based on scheduling availability and context. Those able to participate in a planned online session were assigned to the feedback condition, while participants who had recently completed a match (e.g., at a tournament) or had limited availability were placed in the no-feedback group.

The procedure varied slightly across the two groups. Participants in the feedback group played a 12-board online bridge match on the Bridge Base Online (BBO) platform, during which they received real-time score updates after each board. Immediately following the match, they completed the online questionnaire via Qualtrics. This group participated entirely online. In contrast, participants in the no-feedback group completed the same questionnaire after a match in which no live score information was provided. These matches

were played at official in-person events, such as the Youth Teams World Championship held in Salsomaggiore Terme, Italy (12–17 July 2025). The number of boards played varied depending on the tournament stage (ranging from 8 to 14 boards). The questionnaire was completed either online after the match or in person using the same digital format.

Measures

Items of each measure were followed by a 5-point Likert scale, ranging from 1 (Strongly disagree) to 5 (Strongly agree). Mean scores were calculated for each scale, representing each participant's overall experience in that dimension. A full list of items, including which were reverse-coded, is provided in Appendix A. [1]

Stress. Stress was assessed using four items developed for this study, based on the State-Trait Anxiety Inventory (Spielberger et al., 2003). Items reflected tension, worry, and difficulty relaxing during the match (e.g., "During the match, I felt tense"). The scale demonstrated good internal consistency ($\alpha = .82$).

Risk-taking. Risk taking was measured with four items developed for the bridge context, tapping into boldness and strategic risk-taking during gameplay (e.g., "I made bold decisions"). One item was reverse-coded. The scale showed good reliability ($\alpha = .78$).

Enjoyment. Enjoyment was measured with four items reflecting positive affect and intrinsic motivation while playing bridge (e.g., "I enjoyed playing"). The scale was adapted from the Intrinsic Motivation Inventory (Ryan, 1982) and demonstrated acceptable internal consistency ($\alpha = .70$).

Results

Assumptions and Descriptives

[1] Two additional constructs - Perceived Control and Focus & Flow - were initially included in the questionnaire but were excluded from further analysis due to poor internal consistency ($\alpha = .50$ and $\alpha = .38$, respectively). Efforts to improve reliability by removing individual items did not result in acceptable α values, and therefore these scales were not retained for the main analyses.

Prior to conducting the multivariate analysis of covariance (MANCOVA), assumptions of normality, homogeneity of variance–covariance matrices, and equality of error variances were examined. Skewness and kurtosis values for each dependent variable (stress, risk-taking, and enjoyment) fell within the acceptable range of ±2 for skewness and ±7 for kurtosis (West, Finch, & Curran, 1995), indicating that the assumption of normality was met. Levene's test of equality of error variances was non-significant for stress, $F(1, 46) = 0.17$, $p = .68$; risk-taking, $F(1, 46) = 0.07$, $p = .80$; and enjoyment, $F(1, 46) = 0.15$, $p = .70$, supporting the assumption of homogeneity of variances. Box's test of equality of covariance matrices was also non-significant, Box's $M = 1.41$, $F(6, 14168.26) = 0.22$, $p = .97$, indicating equality of variance-covariance matrices across groups. Bartlett's test of sphericity was non-significant, $\chi^2(5) = 4.84$, $p = .43$, suggesting that the residual covariance matrix was proportional to the identity matrix. Together, these results indicate that all relevant assumptions for the MANCOVA were satisfied.

Table 1 presents means, standard deviations, and intercorrelations for all key study variables, including the dependent variables (Stress, Risk Taking, and Enjoyment) and potential covariates (Age, Years of Bridge Experience, Gender, Level of Competition, and Nationality). Table 1 shows a strong positive association between Age and Years of Experience, $r = .64$, $p < .001$, and a significant negative correlation between Nationality (coded -1 = Polish, +1 = non-Polish) and Risk Taking, $r = -.38$, $p = .01$. Independent sample t-tests indicated significant group differences between the feedback and no-feedback conditions for Years of Experience, $t(46) = -3.92$, $p < .001$; Nationality, $t(46) = -3.15$, $p = .00$; and Age, $t(46) = -2.99$, $p = .00$. No significant group differences were found for Gender or Level of Competition. Nationality was therefore included as a covariate in the main analysis because it met all three inclusion criteria: (a) it was significantly correlated with one of the dependent variables (Risk-taking), (b) it was unevenly distributed across experimental conditions, and

(c) it differed significantly between the feedback and no-feedback groups. Other potential covariates (Gender, Level of Competition, Age, and Years of Experience) were not included because they did not meet criterion (a) - that is, they were not significantly correlated with any dependent variable - even if they were unevenly distributed or significantly different between conditions.

Hypothesis Testing

The main hypothesis of this study was that real-time feedback during competitive bridge matches would affect players' psychological experiences, including stress, risk-taking, and enjoyment. Specifically, it was predicted that players who received live score updates would report higher stress (H1a), greater risk-taking (H1b), and lower enjoyment (H1c) than those who did not receive real-time feedback.

A multivariate analysis of covariance (MANCOVA) was conducted with feedback condition (live feedback vs. no feedback) as the independent variable, stress, risk-taking, and enjoyment as the dependent variables, and nationality as a covariate. The overall multivariate test was not significant, Wilks' $\Lambda = .92$, $F(3, 40) = 1.10$, $p = .36$, partial $\eta^2 = .08$, indicating that feedback condition did not have a significant combined effect on the dependent variables when controlling for nationality[2]. Therefore, this finding suggests that players who received live score updates during play did not report higher stress, greater risk-taking, and lower enjoyment than those who did not receive real-time feedback.

Discussion

The present study set out to examine whether introducing real-time score visibility as a distractor into the game of bridge would alter players' stress, risk-taking, and enjoyment. Previous research has shown that evaluative cues such as live scores can heighten stress and disrupt attentional focus (Keogh & French, 2001), while studies in sports like football

[2] Univariate analyses likewise showed no significant effect of feedback condition on stress, $F(1, 42) = 0.96$, $p = .33$; risk-taking, $F(1, 42) = 1.72$, $p = .20$; or enjoyment, $F(1, 42) = 0.48$, $p = .49$.

demonstrate that score visibility shapes tactical decision-making and risk-taking behavior (Lago-Peñas & Gómez-López, 2014). Based on these findings, it was anticipated that continuous feedback would increase stress, promote riskier play, and reduce enjoyment. Contrary to these expectations, the findings revealed no significant differences between the feedback and no-feedback conditions across the three dependent variables. These null results invite careful consideration of both theoretical and methodological explanations, as well as reflection on the unique characteristics of bridge as a performance domain.

Stress was one of the outcomes where effects of real-time feedback seemed most likely, yet no significant differences emerged between the feedback conditions. Prior work has shown that evaluative stress can impair concentration by diverting cognitive resources toward self-monitoring (Keogh & French, 2001), and studies of elite athletes report that both organizational and competitive stressors shape their psychological states (Hanton et al., 2005; Natsir et al., 2021). Based on these findings, continuous score visibility might have been expected to increase anxiety among bridge players. The absence of such an effect may indicate that players in this cognitively demanding domain are particularly resilient to evaluative distractions. Comparable evidence from esports suggests that high-level competitors frequently employ mastery-oriented and internally regulated coping strategies to sustain focus under pressure (Smith et al., 2019; Drew et al., 2025). Bridge players, who similarly operate in a mentally intensive and evaluative environment, may draw on analogous strategies, reducing the impact of live score updates on their stress levels. Another explanation may be tied to methodological and contextual differences between the groups. The no-feedback group consisted mostly of participants playing in the Youth World Championships, a high-stakes live tournament, whereas the feedback group largely competed in online friendly matches. Such discrepancies in competitive stakes, combined with differences between offline and online play, may have overshadowed the manipulation. Group-level age

differences could also have contributed, as younger and older players may vary in how they experience and report stress. Nationality was statistically controlled for in the analysis, making it less likely to account for the observed null effects, but it remains possible that cultural or experiential factors linked to nationality shaped how players interpreted the competitive context. Taken together, these factors may have exerted a stronger influence on stress than the timing of feedback itself. To address these limitations, future studies should prioritize randomized assignment to feedback conditions and, where feasible, ensure comparable competitive settings across groups. Additionally, complementing self-reported stress measures with physiological markers such as heart rate variability or cortisol responses could provide a more reliable and multifaceted picture of stress reactivity to real-time feedback.

The absence of significant effects on risk-taking also merits discussion. Tournament studies in other domains have consistently shown that information about relative standing can induce strategic shifts: athletes trailing in rankings tend to take more risks, while leaders adopt conservative or protective strategies (Genakos & Pagliero, 2012; Jane, 2023; Gürtler et al., 2023). In sports like football, score visibility clearly shapes decision-making, with tactical adjustments reflecting the pressure of the scoreboard (Lago-Peñas & Gómez-López, 2014). Bridge, however, differs fundamentally from these contexts. As a strategic card game, it rewards consistent, long-term play across multiple boards rather than short-term tactical gambles. A single bold action can have cascading negative effects, not only for the player but also for their partner. This inherent structure may discourage reactive shifts in risk-taking, even when feedback is available. While individual differences such as confidence and anxiety are known to influence risk-taking behavior (Haleblian et al., 2004), random allocation to conditions makes it likely that such traits were distributed evenly across groups. However, even if balanced at the group level, these traits may have moderated how players responded to

score visibility. For example, confident players might perceive live feedback as an opportunity to act more boldly, whereas anxious players could become more cautious or inconsistent under the same conditions. Similarly, gender-based differences in strategic conservatism have been observed in game-based decision-making (Pudjoharsoyo, 2025), suggesting that men and women might interpret and react to real-time scores in systematically different ways. Future studies should therefore directly measure moderators, such as confidence, anxiety, gender, or competitive experience, to test whether feedback exerts heterogeneous effects across subgroups. Incorporating these variables would help clarify whether the absence of overall effects reflects true null relationships, or whether different individual-level responses canceled each other out in the group-level analysis.

The final dependent variable, enjoyment, also did not differ significantly across conditions, despite the expectation that continuous score visibility would undermine intrinsic motivation. According to self-determination theory, enjoyment arises when individuals' basic psychological needs for autonomy, competence, and relatedness are satisfied (Ryan, 1982). In this framework, one might expect that live score updates could have undermined these needs - for example, by reducing autonomy through heightened external evaluation - thereby lowering enjoyment. Yet this was not observed. One possible explanation is that in bridge, enjoyment stems primarily from the intellectual challenge of the game, the cooperative nature of partnership, and the intrinsic satisfaction of solving complex problems. These sources of motivation may have remained largely intact regardless of whether score feedback was present. It is also possible that the timing of measurement played a role: enjoyment was assessed at the end of matches, reflecting general satisfaction rather than in-game fluctuations tied to score updates. As a result, subtle differences in momentary enjoyment may have gone undetected. Future research could address this by employing repeated, in-game measures or

experience-sampling methods, which would allow researchers to capture the dynamic interplay between feedback exposure, need satisfaction, and enjoyment during play itself.

When viewed in a broader context, these findings may suggest that cognitively demanding competitions are less susceptible to the disruptive effects of real-time feedback than physically intensive sports. In chess, for example, the shift to online play during the COVID-19 pandemic initially reduced performance quality, but players adapted over time (Künn et al., 2021). A similar initial effect might have been expected in the present study, since players in the feedback condition were exposed to immediate score updates for the first time. However, no such initial disruption was observed, which raises questions about whether bridge players' task-specific focus or coping mechanisms buffered them from this potential effect. Evidence from esports further shows that while players encounter diverse external stressors, they develop sophisticated emotion- and problem-focused coping strategies to maintain performance under pressure (Smith et al., 2019; Drew et al., 2025). Bridge may operate in a comparable way: its participants are trained to sustain attention on memory, probability estimation, and long-term strategy, which may help them absorb evaluative feedback without allowing it to derail their psychological states Building on this, future studies could examine whether the apparent resilience is unique to bridge or extends to other mentally demanding competitions such as chess, esports, or other strategic games. This also raises the question of whether adaptation to real-time feedback differs systematically across performance domains, and whether cognitively focused competitions foster a resilience that is less pronounced in physically intensive sports. Comparative work across domains would be needed to test this possibility and to clarify the boundaries of when and how feedback timing exerts psychological effects.

Although the study did not reveal significant effects of real-time score feedback on stress, risk-taking, or enjoyment, the absence of differences raises important questions about

the conditions under which evaluative information influences performance. One possibility is that the impact of feedback depends strongly on contextual factors such as the structure of the task, the level of competition, and the psychological characteristics of the players. In bridge, where long-term strategy and collaboration are central, real-time scores may carry less weight than in physically intensive sports, making their disruptive potential weaker. These null results therefore highlight the need for future studies to test more systematically under what circumstances feedback affects psychological states, and for whom such effects are most pronounced. In particular, moderators such as competitive stakes, setting (online vs. offline), or individual differences in personality and coping style deserve closer attention, as well as whether repeated exposure to real-time feedback produces adaptation effects. The findings also have relevance beyond competitive games, given that real-time feedback systems are increasingly embedded in digital education and workplace platforms. Exploring parallels between bridge and such non-sport contexts could offer valuable insights into how feedback structures shape focus, motivation, and performance in cognitively intensive tasks

Strengths and Limitations

A notable strength of the present study lies in its novel application of performance feedback research to the unique context of competitive bridge. While previous studies have examined feedback in physically demanding sports such as football, basketball, or biathlon (Lago-Peñas & Gómez-López, 2014; Gürtler et al., 2023; Jane, 2023), far less attention has been paid to cognitively intensive competitions. Bridge, with its reliance on memory, probability estimation, and strategic cooperation, provides a particularly valuable setting for examining how distractions such as real-time score visibility influence psychological outcomes. By focusing on this domain, the study extends the reach of sport psychology beyond its traditional focus and highlights the importance of considering mental as well as physical performance contexts when evaluating feedback effects.

Another strength lies in the ecological validity of the design. Participants played in genuine competitive settings, whether online or in live tournaments, which ensured that the psychological states measured were grounded in authentic experiences rather than artificial laboratory tasks. This approach reflects the actual environments in which players experience stress, risk-taking, and enjoyment, and thereby improves the external validity of the findings. In contrast, many prior studies on feedback have relied on simulations, hypothetical choices, or contrived settings that may not fully capture the lived pressures of competition. By embedding the manipulation directly into naturalistic play, this study increased the likelihood that the outcomes reflect the real-world influence of feedback structures.

The study also contributes methodologically by adopting an experimental design, a relatively rare approach in research on cognitively demanding competitions. Even though full randomization was not possible, the manipulation of feedback conditions represents an important step beyond purely observational studies and allows for more direct inferences about causal mechanisms. Furthermore, by adapting established constructs such as stress, risk-taking, and enjoyment to the bridge context, the study provides a multidimensional view of players' psychological experience. Stress and risk-taking are central to performance in competitive environments, while enjoyment captures a key aspect of motivation and well-being. By examining these outcomes together, the study moves beyond a narrow focus on performance metrics alone and acknowledges the broader psychological impact of competitive feedback.

Despite these strengths, several limitations should be acknowledged. First, the study did not employ random assignment to conditions, which restricts the ability to draw causal conclusions. Randomization is widely regarded as a cornerstone of experimental design because it distributes potential confounders across groups, thereby reducing bias and supporting valid inference (Bangdiwala, 2011; Kamper, 2018). In this case, the groups

differed systematically in the type of competition they played: the control group (delayed feedback) participated mostly in a high-stakes Youth World Team Championship, while the experimental group (real-time feedback) played friendly matches online. These differences in competitive stakes, combined with disparities in age distribution and nationality composition between groups, may have exerted a stronger influence on psychological experiences than the manipulation itself, potentially overshadowing true effects of score visibility.

A second limitation concerns the reliance on self-reported measures of stress, risk-taking, and enjoyment. Self-report tools are widely used in sport psychology because they are feasible, cost-effective, and capable of capturing subjective states that cannot always be objectively measured. In this study the goal was to capture how players actually felt during and after competition, making self-reports the most straightforward way to assess these experiences. Nevertheless, such measures remain vulnerable to social desirability biases, inaccurate recall, and subjective interpretation of scale items (Podsakoff et al., 2003). For example, players may have underreported their stress to appear more composed, overstated their enjoyment to align with expected norms, or misjudged their own levels of risk-taking in the absence of objective benchmarks. Complementary data sources- such as physiological indicators (e.g., heart rate variability, cortisol, galvanic skin conductance) or behavioral measures - could enrich them by highlighting discrepancies or confirming consistencies between subjective experiences and physiological states. Future studies could therefore adopt a multimethod approach, in which subjective and objective measures are collected in parallel to provide complementary perspectives. While physiological or behavioral indicators (e.g., heart rate variability, cortisol, or in-game decision logs) do not directly measure subjective states, they can reveal discrepancies or convergences that deepen understanding of players' experiences under different feedback conditions.

Another limitation relates to the relatively small sample size and restricted population. The study drew primarily on young, competitive bridge players, which limits the generalizability of findings to older or more recreational populations of players, as well as to other mentally demanding activities such as chess or e-sports. Small samples also reduce statistical power, increasing the risk of Type II errors and making it more difficult to detect subtle but meaningful effects. This limitation is particularly important when considering the null findings, as it remains possible that small differences between conditions were present but not captured statistically. Replications with larger and more diverse samples would therefore be essential to verify the robustness of these results.

Taken together, these strengths and limitations highlight the study's contribution as an exploratory first step into the psychology of feedback in cognitive sports, while also underscoring the need for more controlled, larger-scale, and multimethod investigations to clarify the role of real-time feedback in shaping stress, risk-taking, and enjoyment.

Conclusion

This study investigated the impact of real-time versus delayed score feedback on stress, risk-taking, and enjoyment in competitive bridge. Contrary to expectations based on findings from physical sports, the results did not reveal significant differences between feedback conditions on any of the measured psychological outcomes. These findings suggest that bridge players, who are accustomed to competing without live scoring, may be less susceptible to the distracting effects of performance information than athletes in more physically intense settings. Although methodological limitations such as non-random assignment and reliance on self-report measures temper the strength of these conclusions, the study provides a valuable first step in extending research on performance feedback and distraction into a cognitively demanding, strategic environment. By highlighting both the resilience and complexity of player responses to feedback structures, the study lays the

groundwork for future research that can refine our understanding of how score visibility shapes psychological experiences across a wide range of competitive domains.

Table 1

Variable	*M*	*SD*	1	2	3	4	5	6	7	8
1. Stress	2.76	0.95	-							
2. Risk Taking	3.13	0.95	-.15	-						
3. Enjoyment	3.83	0.78	-.28	-.04	-					
4. Age (years)	22.67	5.17	.10	-.06	-.01	-				
5. Experience (years)	8.88	4.34	-.02	-.05	-.04	.64**	-			
6. Gender	-0.58	0.81	-.11	.00	-.06	-.07	-.21	-		
7. Level of Competition	0.04	1.00	.19	.25	-.12	-.01	-.02	-.11	-	
8. Nationality	-0.46	0.89	.25	-.38**	-.01	.29*	.21	-.22	-.13	-

Note. Gender coded as -1 = male, +1 = other. Level of Competition coded as +1 = international, -1 = other. Nationality coded as -1 = Polish, +1 = non-Polish.
*$p < .05$ **$p < .01$.

Appendix

Appendix A

Questionnaire Items and Reverse-Coded Items

a) Stress

1. During the match, I felt tense.
2. During the match, I was worried about my performance.
3. During the match, I found it difficult to relax.
4. During the match, I felt calm. (R)

b) Risk-Taking

1. During the match, I made bold decisions.
2. During the match, I adjusted my strategy as the game progressed.
3. During the match, I prioritized high reward plays, even if they involved greater risk.
4. During the match, I avoided taking risks. (R)

c) Enjoyment

1. During the match, I enjoyed playing.
2. During the match, I felt satisfied with my performance.
3. During the match, I found the game enjoyable and immersive.
4. I would like to play more matches under similar conditions.

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