



A model of constructive procedural justice through the example of a student academic competition

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ABSTRACT

Evaluation is critical in talent development because it can significantly determine perceived effectiveness and experiences. Utilizing the logic of procedural justice and extending the theory, we have created a model of constructive procedural justice consisting of three interdependent stages (constructiveness of written feedback, fairness of decision-making, and psychological gains). This study analyzes the evaluation process of a series of national-level student academic conferences and competitions in Hungary using this constructive procedural justice model. Concerning written evaluations, our results highlight that constructive textual feedback is more decisive than the score achieved. Participants perceive a lower score as fair if the textual assessment is detailed, thorough, supportive, suggests areas for improvement, and contains a forward-looking approach. In addition, providing support for voice and jury neutrality is essential to ensuring that students leave with a truly positive experience and continue working with renewed vigor, regardless of the competition scores achieved. The results obtained apply to other activities evaluated by written feedback, including theses, dissertations, or publications.

1. Introduction

Professional content and style influence the impact of feedback, particularly concerning feedback formulation and the overall image of the review process. Reviewers seldom consider how their written or verbal comments will resonate with students. Demoralizing critiques can discourage students from freely expressing their opinions. It also affects perceptions of jury impartiality. Students may doubt their competence. Moreover, the experience could induce negative memories of the process, regardless of the professional content of the feedback.

Procedural justice examines people's subjective assessment of the fairness of proceedings (Tyler & Mentovich, 2023). Thibaut and Walker (1975) emphasized that participants are more likely to accept the judge's decision, regardless of the outcome, if they perceive the proceedings as fair. Such perceptions require the creation of a neutral atmosphere by the decision-makers, in which those involved are free to express their views.

We furthered this logic when we interpreted procedural justice in a situation where feedback is provided in several stages. Constructive procedural justice refers to judging evaluation processes as constructive and fair. Students participating in the educational and talent management process and competitions must regard the evaluation process as constructive and fair. A lack of perceived fairness can disappoint students, interrupt their talent development process, and compromise their potential, leading to

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suboptimal outcomes for all involved.

Our research question examines how the logic of procedural justice can describe the perceived justice of the adjudication process. In response, we employed the logic of procedural justice to create a three-step constructive procedural justice model of how participant perceptions of the constructiveness of the written feedback received before the competition affect the perceived fairness of the jury's decision-making and how this affects the psychological gains that individuals can obtain.

The present study examines the interacting factors of constructive procedural justice through participant perceptions of a long-standing Hungarian talent management conference and competition series. The National Student Research Conference (NSRC) system has a seventy-year history in Hungary. Students joining the student research society write academic papers with the aid of a supervisor (mentor). The institutional jury nominates the best papers for the biennial national conference series, which includes 16 professional conferences. (Kolozsár et al. (2024) Our study focused on the Economics Section, one of the largest. The study explores how participants perceive the constructiveness of written feedback, the fairness of decision-making, their participation in the event, and how the phases build upon each other. This model applies to activities evaluated by written feedback for texts, including theses, dissertations, or publications.

1.1. Literature review and hypothesis development

1.1.1. Fairness of assessment perceived by students

The perceived fairness of evaluations and the entailing consequences are significant in work and educational settings. Just as the perceived fairness of workplace evaluations and feedback can positively impact job satisfaction and morale (Spar & Sonnentag, 2008), perceived fairness in education affects students' socio-emotional and learning outcomes and increases the legitimacy and trust of assessments (Rasooli et al., 2023). The perceived fairness of evaluation procedures influences student motivation (Javadizadeh et al., 2022), commitment, and attitudes toward the educational institution and instructors. Transparent assessment processes with clear, consistent, and unbiased requirements and evaluation criteria create positive learning environments that treat students as partners in the processes. Students prefer to work, perform better, and trust the educational institution and their teachers more in such positive environments. Overall, a perception of justice contributes to a positive learning experience and evaluation of learning outcomes. Achieving pedagogical goals involves student-perceived justice. However, several authors stress that direct examinations of student perceptions of fair assessment have received relatively little attention (Rasooli et al., 2023; Simmons et al., 2013).

Simmons et al. (2013) observe that few studies have specifically examined the perception of fairness as an influencing factor in learning environment satisfaction. In their analysis, they looked at equity factors as distinct from quality-of-service factors and found that "respectful partnership" had a significant and positive impact on satisfaction levels. The authors emphasize the importance of this finding because it stresses the understanding that fairness perception contributes to a more comprehensive picture of student experiences. Hiatt et al. (2023) confirmed that student trust in professors positively influences student satisfaction and persistence.

Consistent communication is also essential. Sanders and Aplin-Houtz (2023) proved that students' negative perceptions of informational justice frequently combine with negative procedural justice perceptions. Van Der Kleij and Lipnevich (2021) reviewed 164 studies on student perceptions of assessment feedback published between 1987 and 2018. The study did not group individual studies concerning the characteristics of feedback situations but according to the use of student and teacher terms. It can be assumed that the studies included in the literature review were based on classroom feedback situations.

Research on this topic was typically conducted in classroom environments (Harris et al., 2014) and related to the perceived fairness of the assessment and grading, the perception of conventional, systematic assessment related to courses, where relationships between evaluating instructors and evaluated students were continuous and prolonged (typically several months or even years) (Lipnevich & Smith, 2009). Studies have been conducted at various educational levels, including secondary school and university. In addition to examining the above, pedagogical situations involving complex assessments occurring under previously announced conditions in unfamiliar settings deserve attention. The present study concentrates on an example of such a pedagogical situation — The National Student Research Conference (NSRC), a Hungarian academic competition and conference for university students — and examines student experiences of the assessment process and its effects.

1.1.2. Constructive procedural justice and feedback in the case of a student academic competition: the research gap

The evaluation process in NSRC begins with written feedback on the submitted academic paper, followed by a presentation and academic discussion at the conference. The evaluators come from various institutions, have differing backgrounds and experiences, and are largely unfamiliar with the students. The biennial conference typically hosts over 500 presentations and features over 200 evaluators, making a coherent level of judging particularly challenging. Two reviewers — both conference jury members — provide written evaluations of the papers. Students present their work to the jury and participate in a professional discussion and question segment. The jury scores the performances of the oral rounds in each session. The oral and written scores determine first, second, and third places in each section. A maximum of one-third of the presented papers can be ranked, and up to 50 % can receive other prizes. Thus, the NSRC is a blend of an academic conference, competition, and festival due to the cavalcade of programs that accompany it (Kolozsár et al., 2024).

The present research concentrates on assessment characteristics that differ from conventional classroom assessment. First, NSRC assessment is about voluntary rather than compulsory tasks. Second, evaluators are not acting like lecturers who know the given course and the students and who typically define and communicate the requirement, but expert reviewers, usually teachers from various institutions. Therefore, unlike conventional instructors, conference evaluators assess solely on submission content and consider nothing else, i.e., continuous course-related assessments and class participation. In addition to the score and possible ranking (final

result), textual evaluation plays a major role in student research competitions. Written feedback and opinions expressed in the oral round provide professional feedback. The developmental role of feedback and the support of continued student work in higher education are increasingly vital (Dawson et al., 2019). This supportive approach is central to the basic philosophy of the seventy-year SRC movement. The competition and conference involve multi-stage evaluation, entailing that the perceived harmony of textual (written and oral) opinions and numerical results (scores and rankings) also greatly influence student perceptions of assessment fairness.

Feedback given to students at their home universities precedes NSRC evaluations. Institutional feedback includes development suggestions and opinions from mentors, written criticisms via the institutional conference, and scores and jury opinions. At the national conference, students leave the familiarity of their institutions and compete in a new, “unknown” terrain. (Students of the conference-hosting institution may be familiar with the location of the oral round, but the reviewers are always teachers from other institutions.) The requirements and evaluation criteria are known in the NSRC evaluation process because they are announced in advance in the call for the conference/competition; however, the identities of the judges—typically respected instructors whose names and works may be familiar to the students but are otherwise strangers—is not known in advance.

Overall, the distinctiveness of NSRC evaluation lies in its complexity. Although the general conference rules and guidelines are known, the conference environment, combined with the unfamiliarity between students and evaluators, creates many unknowns. This is a one-off occasion without the possibility of revision, correction, or refinement of communication, etc.

The Economics Section of the 2023 NSRC yielded more than 1200 written evaluations prepared by 226 reviewers. High immersion also means wider variance. Improving the quality of written evaluations, creating a positive atmosphere in the numerous chapter meetings, and ensuring a positive conference series experience is an inspiring challenge that forms the cornerstone of student research activity dissemination through word of mouth. The impressions obtained about the fairness of the judging process and its results may influence the assessment of the entire NSRC process, including its usefulness, experientiality, and, indirectly, the development of attitudes towards the continuation of scientific work. NSRC is a vital field of experiential education with significant traditions (Kolozsár et al., 2024); however, fulfilling this role entails that participating students perceive the process as fair.

The concepts of justice applied in organizational environments, employee evaluations, and the approach and adaptation of procedural and distributive justice are useful in higher education and benefit students, faculty, and institutions (Grace, 2017). In higher education, Głowczewski and Burdziej (2023) conducted research among university students in Poland. The study findings indicate that the perception of procedural fairness fosters a stronger identification with the university, which, in turn, enhances student trust in university authorities. Zhang et al. (2024) researched college students in Central China and found that perceived organizational justice correlates positively with professional commitment and negatively with academic stress.

This study utilized the constructive procedural justice approach to create a model to examine the direct and indirect effects of justice perceived by students participating in the NSRC (based on written criticism and oral round experiences) on the perception of outcomes and lived experience.

1.1.3. Constructive procedural justice at student research conferences

Our research question was how the logic of procedural justice can be used to describe the perceived justice of the adjudication process. Using the logic of procedural justice and extending the theory, we created a three-step model of constructive procedural justice. We investigate how participant perceptions of the constructiveness of the written critiques received before the competition affect the jury’s perception of the procedural justice of the decision and how this affects the psychological rewards that students may obtain.

The model of constructive procedural justice distinguishes three phases that build on each other (Fig. 1):

In the pre-oral phase, submission authors judge the reviewers’ work based on *the constructiveness of the written feedback*. Papers submitted to the NSRC receive written reviews first. Such written feedback is decisive from the point of view of procedural justice.

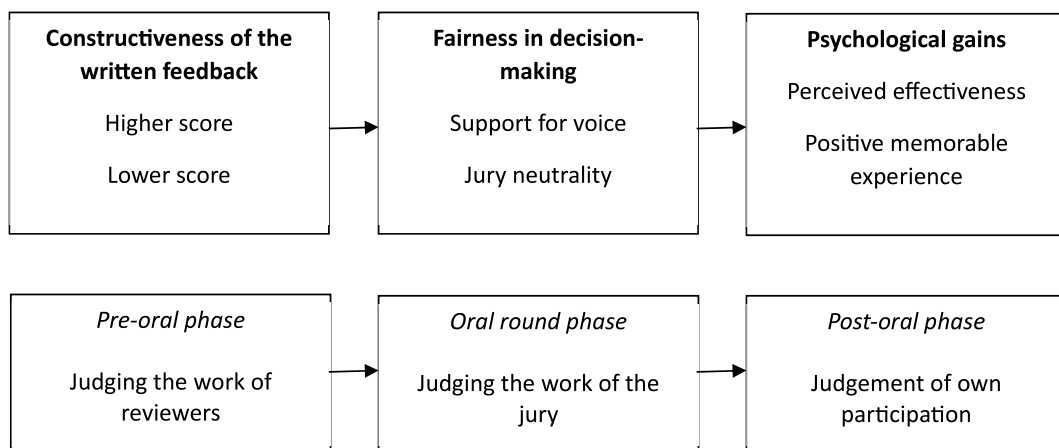


Fig. 1. Model of constructive procedural justice in scientific competitions
Source: own elaboration.

In the oral round, participants present their papers, where they judge the *fairness of decision-making* based on the extent to which the jury allows for scientific debate, the extent to which the contestants can make their voices heard, and how neutral they perceive the jury.

In the post-oral phase, contestants reflect on their participation and what the conference provided (*psychological gains*). They evaluate their achievements and recall the extent to which the conference brought positive, memorable experiences.

The constructiveness of written feedback influences the fairness of decision-making, which in turn affects psychological gains.

Our comprehensive, integrated model of procedural justice logic and its extension builds on the psychology, education, management, and legal literature. For the first phase, we draw from [Hattie and Timperley's \(2007\)](#) approach to effective feedback. For the second phase, we refer to [Tyler's \(1989, 2007\)](#) and [Tyler and Mentovich's \(2023\)](#) arguments on the justice of decision-making that distinguish between voice and neutrality factors. Concerning psychological rewards, we drew on the approaches of [Tyler \(2007\)](#) and [Kim et al. \(2012\)](#) for memorable experiences.

In the following, we scrutinize the different elements of the model based on the relevant literature and NSRC practices. We also formulate hypotheses based on the logic presented in the model.

1.1.4. Constructiveness of written feedback

Assessing the constructiveness of written feedback is the model's first stage. The stimulus the contestant encounters at this stage before the oral round is crucial and likely influences the contestant's perception concerning the fairness of the jury's decision-making.

Constructive feedback refers to professionally correct, forward-looking, and supportive feedback. This logic built into the [Hattie and Timperley \(2007\)](#) model stipulates that effective feedback should answer three key questions: "Where am I going?" (Feed-up), "How am I progressing?" (Feedback), and "Where to go next?" (Feed-forward).

"Feed-up" is related to the learning objectives of the task. If students understand the learning goal, they can understand the purpose of feedback and how it can help them achieve the goal ([Mandouit & Hattie, 2023](#)). Learning objectives can be communicated in several ways, orally or in writing. The overall objective of the NSRC is to "*Encourage student research and arts activities and support talented students and their masters. Help you progress in research and start your career, encourage applications for doctoral programs.*" ([National Council of Student Research Societies, 2024](#)). In other words, the primary goal is not to win the competition but to encourage academic work and enable participants to develop as much as possible.

The second feedback question, "How am I doing?" (feed-back), refers to how the student progresses towards the learning goal. This question is often associated with assessment tasks and aims to specifically indicate student progress ([Hattie & Timperley, 2007](#)). The NSRC states the following concerning written feedback: "*The purpose of the written evaluation is to examine the independent results achieved by the student that meet the academic requirements of the field and to provide feedback with a textual evaluation explaining the substantive parts of the content*" ([National Council of Student Research Societies, 2024](#)).

The third question from [Hattie and Timperley \(2007\)](#), "What's next?" (feed-forward), aims to move students to higher levels of achievement. Since the aim is to develop a student's academic skills through the creation and publication of an entry, it is vital to consider how supportive and forward-looking reviewer opinions are.

Students receive two judgments at the NSRC and a maximum of 60 points in the Economics Section, so it is highly likely that the score of one of the judges will be higher than that of the other.

A contestant receives two evaluations for the essay. Thus, our model includes the constructiveness perception of the written feedback from both evaluators (the higher and the lower scorer). The percentage value of the score given to the text assessment places the essay on a rating scale, influencing the perception of the text assessment. Separately treating the higher-scoring and lower-scoring assessments is vital. Examining the perception of lower and higher-scoring feedbacks may highlight that students may not necessarily feel that a higher score alone is supportive if the associated textual feedback is not constructive.

1.1.5. Fairness of decision-making

The model's second stage involves judging the fairness of the jury's decision-making.

[Tyler and Mentovich \(2023\)](#) classify two factors under Fairness of decision-making — voice and neutrality. Adapted to the NSRC context, the terms were modified to support *for voice* and *jury neutrality*.

1.1.6. Support for voice

Support for voice means creating a supportive atmosphere that provides space for academic debate. Authors can make their voices heard while receiving professional questions from the jury. According to [Thibaut and Walker \(1975\)](#), a vital issue in assessing fair decision-making is the extent to which the procedures give stakeholders control over the outcome to ensure fair results. Participants cannot fully control decisions in the competitive environment since the jury controls the judging. Thus, indirect means of exercising control over the results are chosen. A crucial tool in exercising such control is to allow participants to express their points of view (their "voice") to influence decision-making ([Blader & Tyler, 2003](#)).

When involved in legal disputes, people demand the opportunity to tell the stories in their own words from their points of view (voice) before deciding to deal with the dispute or problem ([Tyler, 2007](#)). At the academic conference, participants present their scientific achievements, tell their stories, and reflect on jury questions. Encouraging such an exercise of voice requires a supportive atmosphere, which is why *support for voice* is a decisive aspect of scientific competitions. Creating opportunities for high-quality debate is a solution that academic journals often struggle with. If authors disagree with the reviewers' written proposals in the current academic publication practice, they have little recourse and limited opportunities to engage in academic debate over their research ([Resnik & Elmore, 2016](#)). However, the NSRC provides a supportive atmosphere for academic debate and encourages the

expression and defense of opinions. Competitors can also reflect on the criticisms raised in the verbal framework. The perceived constructiveness of the written feedback can affect the perception of support for voice. While demoralizing criticism can be discouraging, constructive criticism can facilitate a more articulate expression of one’s opinions.

Based on this, we consider the following hypotheses:

- H1. The constructiveness of higher-scoring judging has a direct positive effect on support for voice.
- H2. The constructiveness of lower-scoring judging has a direct positive effect on support for voice.

1.1.7. Jury neutrality

Decision-makers should be unbiased and impartial in all situations and based decisions on factual information (Tyler, 1989). The academic competition jury is expected to decide impartially. From which institution students come or who their mentors or consultants are should not influence the jury in any way. Reviews are expected to be written in a professionally correct but supportive format. The judges are drawn from the members of the section jury, which also supports the academic debates of the oral round. For reasons of professional correctness, it can be assumed that the constructive nature of preliminary written evaluations has a positive effect on the perception of jury neutrality. Based on this, we consider the following hypotheses:

- H3. The constructiveness of the higher-scoring judging has a direct positive effect on jury neutrality.
- H4. The constructiveness of the lower-scoring judging has a direct positive effect on jury neutrality.

In the model that Tyler (2007) proposes, the voice has a positive effect on neutrality, which is also logical in our case since the more space the jury provides voice (support for voice), the more neutral it seems. Based on this, we consider the following hypothesis:

- H5. Support for voice has a direct positive impact on jury neutrality.

1.1.8. Psychological gains

The third stage of the model involves psychological (i.e., intangible) rewards.

Since the NSRC positions itself as a competition and an event offering memorable experiences, it emphasizes psychological gains. The conference aims to keep the competitive spirit within a healthy framework and to ensure successful participant performances even if they do not attain a winning place. The conference also encourages participants to concentrate on memorable positive experiences.

1.1.8.1. Perceived effectiveness. Perceived effectiveness is the judgment of a competitor’s own performance, regardless of the actual ranking achieved. There are winners and losers in a competition. No one enjoys losing; however, not every participant can win. NSRC participants are more accepting of “defeat” if the decision-making procedures are fair. Fair procedures are designed to benefit all parties rather than overemphasize the victory of some participants over others (Tyler, 2007). For this reason, the National Council of Student Research Societies, which brings together institutional student research societies and the NSRC series, communicates that the conference enriches all participants.

The logic behind the procedural justice approach makes “not winning” more palatable because the focus falls on the process rather than overemphasizing victory or defeat. Consequently, justice in decision-making aims to benefit all participants rather than exclusively celebrating the few who triumph over others (Tyler, 2007). A neutral jury judges the contribution of each participant, influencing the perceived effectiveness of fairness of decision-making, support for voice, and jury neutrality. Based on the above, the present study considers the following hypotheses:

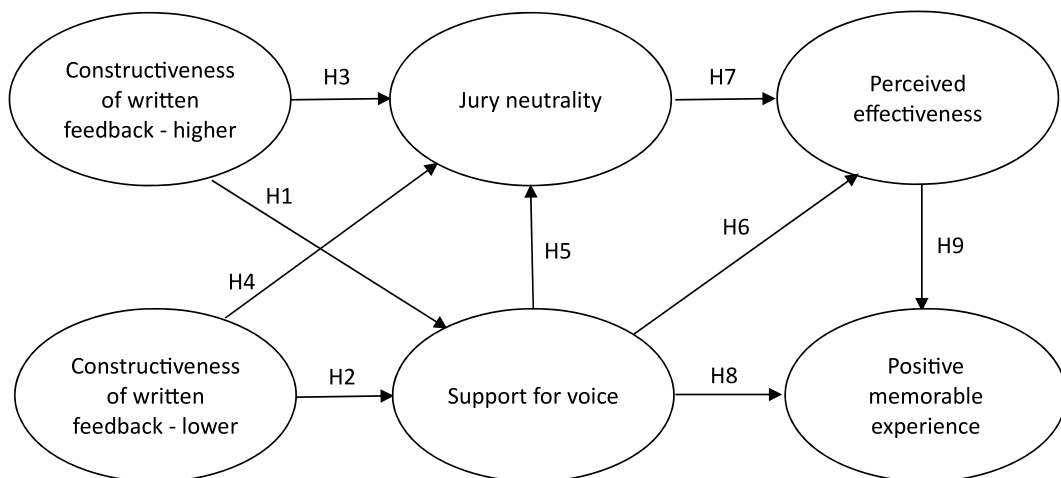


Fig. 2. Model of constructive procedural justice in scientific competitions (hypotheses)
 Source: own elaboration.

H6. Support for voice has a direct positive impact on perceived effectiveness.

H7. Jury neutrality has a positive impact on perceived effectiveness.

1.1.8.2. Positive memorable experience. A positive memorable experience is a series of moments remembered after an event (Kim et al., 2012). Memorable experience stimulates the cognitive systems of individuals, which gives participation in events a distinctive meaning and interpretation (Manthiou et al., 2016). In addition to professional content, the conference (as a science festival) also offers rich and entertaining leisure and community programs and provides an opportunity for professional and community networking. The combined factors above determine how memorable participation in the event is.

A defining event in the NSRC is the condensed period when contestants present their work and participate in an academic debate where they can exercise their communication skills (voice) and become focal points. This condensed period affects the self-evaluation of effectiveness and how positively the event is remembered. Considering the above, we offer the following hypothesis:

H8. Support for voice has a direct positive impact on positive memorable experience.

Of course, the positivity of a memorable experience is also influenced by the degree to which someone rated their own performance positively. Based on this, we consider the following hypothesis:

H9. Perceived effectiveness has a direct positive impact on positive memorable experience.

Fig. 2 shows the model with hypotheses:

2. Methods

2.1. Presentation of the sample

For the first time in NSRC history, a cross-border institution – János Selye University in Komarno, Slovakia – organized and hosted the Economics Section in 2023. The conference featured 512 papers presented by 556 students from 35 institutions in 71 professional sections (Takácsné György et al., 2023). Written evaluations totaled 1207, and 226 teachers participated in the professional juries, which awarded 170 prizes.

The questionnaire survey conducted after the 2023 NSRC involved 275 students (49.5 % of participants). The range of respondents represents the population of NSRC participants well in terms of educational levels, represented institutions, professional areas, and sessions. The respondents represented 26 institutions, and responses were received from all 71 sessions. Respondents included 45 first-place winners (16.4 %), 46 s-place winners (16.7 %), 12 third-place winners (4.4 %), 57 special prize winners (20.7 %), and 115 students (41.8 %) who successfully presented but did not rank in the competition (Table 1).

Most survey respondents wrote their SRC thesis as bachelor students (68.0 %), some were high school students, and the rest (30.5 %) were master's students. Some respondents had already completed their studies when they participated in the NSRC, and some were pursuing doctoral studies (8.4 %). Concerning work experience, 74 % of respondents claimed to be employed.

2.1.1. Measuring instruments

With the help of Qualtrics, we conducted a structured questionnaire survey. Scales consisting of several items have been developed for measuring constructs (Diamantopoulos et al., 2012), which were pre-tested during the 2021 survey. The statements of the six reflective constructs were evaluated on a 5-point Likert scale (1 = disagree at all, 5 = completely agree). The survey took less than 12 min to complete, minimizing respondent fatigue.

To measure the *constructiveness of written feedback*, we used a self-developed 4-item scale based on the logic of Hattie and Timperley (2007), which considered the specificities of the academic competition. We used the same statements to assess the *constructiveness of higher and lower-scoring reviews*. The only alteration was that we specified whether the statement referred to the higher or lower-scoring review. *The support for voice* is a proprietary six-item scale operationalizing the concept of voice in Blader and Tyler (2003) in the context of academic competition. *Jury neutrality* is a four-item proprietary scale building on the Tyler (1989) concept of neutrality by adapting it to the context under study. *Perceived effectiveness* is the participant's own perceived success (not actual ranking), measured

Table 1

Characteristics of the sample (n = 275).

Place achieved		Education level (at the time of writing work)	
First Place	16.4 %	Master	30.5 %
Second place	16.7 %	Bachelor	68.0 %
Third place	4.4 %	High School	1.5 %
Special prize winner	20.7 %		
Not placed	41.8 %	Education level (at the time of the NSRC)	
		PhD	8.4 %
Working situation		Graduated	31.6 %
Employed	73.8 %	Master	32.4 %
Unemployed	26.2 %	Bachelor	26.5 %
		High School	1.1 %

Source: own elaboration

by a self-developed three-item scale. *Positive memorable experience* is a self-developed three-item scale measuring the extent to which the event was unforgettable and wonderful.

3. Results

Since our goal is to measure the constructs in the model and the relationships between them, we used PLS-SEM (partial least squares structural equation modeling), an advanced modeling technique widely used in many social science disciplines. PLS-SEM is preferred over CB-SEM (covariance-based structural equation modeling) when “the structural model is complex and includes many constructs, indicators, and/or model relationships” (Hair et al., 2019).

The present study utilized the guidelines in Hair et al. (2019) to assess PLS-SEM model quality. Dijkstra-Henseler’s rho (ρ_A) indicates construct reliability. All constructs are reliable in our case, as the rho is above 0.7. Convergent validity is indicated by the average variance extracted (AVE) value and all constructs are significantly above the threshold of 0.5 (see Appendix).

HTMT (heterotrait-monotrait ratio of correlations) was used to test discriminant validity where the value between constructs must be less than 0.85 throughout. In our case, the highest HTMT value was 0.76, indicating that the constructs are sufficiently distinct.

The goodness of the model fits with SRMR = 0.072, i.e., below the threshold of 0.08.

3.1. Direct effects

Table 2 and Fig. 3 summarize the testing of direct effects in the model.

Constructiveness of written feedback has a positive direct effect on support for voice for both higher ($\beta = 0.293$; $p < 0.001$) and lower ($\beta = 0.403$; $p < 0.001$) written reviews, resulting in the acceptance of H1 and H2 hypotheses.

While *constructiveness of written feedback* does not directly affect *jury neutrality* ($\beta = 0.025$; $p = 0.339$) for higher scores, positive direct effects can be observed for lower scores ($\beta = 0.201$; $p < 0.001$), which rejects the H3 hypothesis and accepts the H4 hypothesis.

Support for voice has a positive direct effect on both *jury neutrality* ($\beta = 0.570$; $p < 0.001$) and *perceived effectiveness* ($\beta = 0.197$; $p < 0.05$), resulting in the acceptance of the H5 and H6 hypotheses.

Jury neutrality has a direct positive effect on *perceived effectiveness* ($\beta = 0.295$; $p < 0.01$), support for voice ($\beta = 0.417$; $p < 0.001$), and *perceived effectiveness* ($\beta = 0.165$; $p < 0.05$) on the *positive memorable experience*, resulting in acceptance of H7, H8, and H9 hypotheses.

4. Discussion

The model we examined demonstrates constructive procedural justice based on the experiences of a student scientific competition. This model builds on three phases constructed on top of each other.

Before the oral round at the NSRC, the contestants receive two written evaluations, the first major impulse in the judging process. Feedback can be demoralizing if it is in an inappropriate style or contains a humiliating, accountable, or lecturing tone or content. Constructive criticism is professionally meaningful, relevant, and correct but also forward-looking in helping to develop the work. In such cases, participants may experience feelings of recognition. Participants may also feel that the reviewer treats them as partners rather than subordinates. However, constructive criticism should not be confused with unjustifiable praise or overly laudatory assessments, which also communicate the balance of power.

The more constructive the contestant perceives the written evaluations, the more they anticipate a supportive atmosphere during the oral presentation, which can be said for both higher ($\beta = 0.293$) and lower scores ($\beta = 0.403$). In the latter case, the strength of the correlation is greater, revealing that the degree of constructiveness is vital for both evaluations but critical for the lower score. The result also highlights that students perceive the decision-making process as fair not through high scores but by the degree to which they receive constructive criticism. Students may perceive a possibly lower score as fair if the textual assessment is detailed, thorough, supportive, highlights the areas to be developed, and is prepared with a forward-looking approach.

It was assumed that the constructive nature of the written evaluation also directly affects the *jury neutrality*, but the direct effect can

Table 2
Direct effects in the model.

Path	β	t-value	p-value	95 % BCI	
<i>Constructiveness of feedback (higher)</i> - > <i>Support for voice</i> (H1)	0.293	4.181	0.000	0.155	0.430
<i>Constructiveness of feedback (lower)</i> - > <i>Support for voice</i> (H2)	0.403	7.095	0.000	0.291	0.515
<i>Constructiveness of feedback (higher)</i> - > <i>Jury neutrality</i> (H3)	0.025	0.414	0.339	-0.088	0.143
<i>Constructiveness of feedback (lower)</i> - > <i>Jury neutrality</i> (H4)	0.201	3.843	0.000	0.100	0.302
<i>Support for voice</i> - > <i>Jury neutrality</i> (H5)	0.570	8.887	0.000	0.441	0.689
<i>Support for voice</i> - > <i>Perceived effectiveness</i> (H6)	0.197	2.253	0.012	0.030	0.373
<i>Jury neutrality</i> - > <i>Perceived effectiveness</i> (H7)	0.295	3.211	0.001	0.115	0.471
<i>Support for voice</i> - > <i>Positive memorable experience</i> (H8)	0.417	6.344	0.000	0.287	0.544
<i>Perceived effectiveness</i> - > <i>Positive memorable experience</i> (H9)	0.165	2.294	0.011	0.027	0.309

Note. BCI: Bootstrap Confidence Interval.

Source: own elaboration

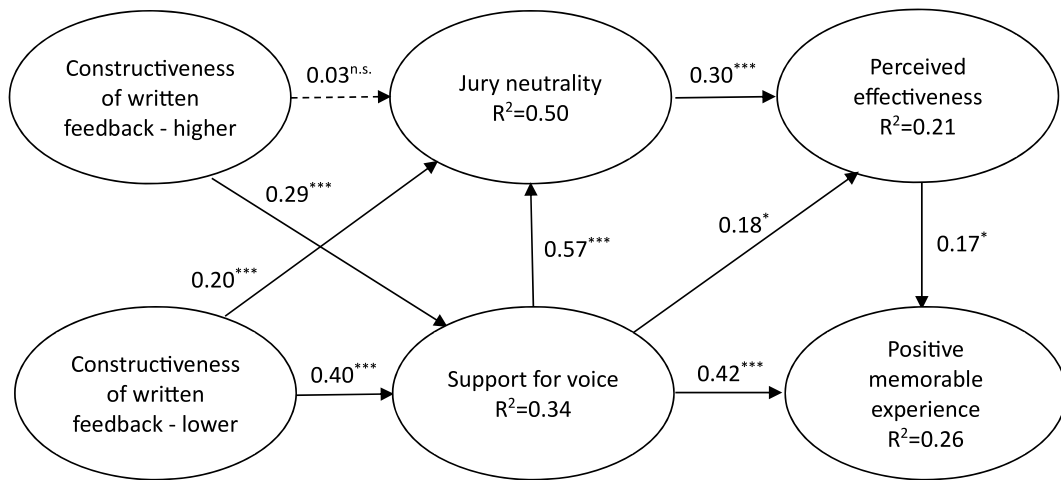


Fig. 3. Model of constructive procedural justice in academic competitions (measurement model and results)

Source: own elaboration

Note: all coefficients are standardized (*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$, n.s.: not significant).

only be detected in the case of the lower score ($\beta = 0.201$), and no such effect can be seen in the case of the higher score ($\beta = 0.025$). Although the latter does not appear to have an effect, an indirect effect can be detected ($\beta = 0.167$, [0.0801; 0.2651]), as support for voice fully mediates the path between the *constructiveness of the higher-scoring written review* and the *jury neutrality*. Support for voice plays a decisive role because it influences the path between the *constructive nature of the lower score written evaluation* and the *jury neutrality* ($\beta = 0.230$, [0.155; 0.312]).

The oral round spotlights contestant voices, partly through presentations and partly through academic debates. *Support for voice* has a positive effect on *jury neutrality* ($\beta = 0.570$), i.e., the more the participant feels that their voice is being allowed in a supportive atmosphere, the more they think that the jury is neutral. Suppressing the voice, restraining debate, and ill-motivated questions are not considered good practices. The opportunity to react to assessments, answer possible criticisms, and debate professionally are factors that encourage students to feel that they are being treated as partners, which increases the perception of justice, results in a better learning environment, and increases trust in the institution — in our case, the NSRC.

Participants also appraise the psychological gains. According to the logic of procedural truth, when participants perceive a fair decision-making process, they also tend to perceive their own performances as effective. *Jury neutrality* ($\beta = 0.295$) and support for voice ($\beta = 0.197$) have a direct positive effect on perceived success.

The more successful the participant feels ($\beta = 0.165$) and the higher the level of support for voice ($\beta = 0.570$), the more positively they reflect on the event. Support for voice is a key element of the process, as it has a positive impact on how successful the participants consider themselves to be and how well they remember the event.

5. Conclusion

The results indicate that the factors examined according to the logic of procedural justice, the characteristics of the fairness of the criticisms, the atmosphere of the oral round, and the possibility of responding (treated as partners) all have significant direct or indirect impacts on student perceptions, thus on student satisfaction with the NSRC and their own performances. The above implies that the event organizers deserve increased attention in raising the perceived fairness of the judging processes, which aligns with the philosophy and pedagogical goals of the NSRC. The large number of participants and the judges coming from different institutions and with different experiences all pose a significant challenge to raising perceived fairness. The results provide lessons to be considered from the point of view of scientific student research conferences and in other educational situations, such as competitions or conferences where the evaluating teachers are unfamiliar with the students assessed. Also, the assessments are not issued within the context of curriculum or course expectations but within a multi-player, complex evaluation process.

Suggestions:

First, selecting, informing, and preparing the judges in advance is vital for ensuring judging quality. In connection with this:

- On the one hand, professional, high-quality, fair but at the same time developing and supportive (but not overpraising) criticism should be developed.
- On the other hand, dismantling the myth of high-scoring but non-content-rating, “head-stroking” criticism is crucial.

Although this approach aligns with the NSRC philosophy, a philosophy the teachers, organizers, mentors, judges, and jury members who have been involved in the movement for years and decades all represent, ensuring this in practice is challenging, particularly with a large number of conference participants. As mentioned previously, when considering the specifics of the NSRC assessment, it is vital

to recall that evaluators are not teachers who contribute organically to the given learning process but are instead external, independent actors who are professionally proficient in the given field and are asked to evaluate according to centrally predetermined criteria. Conference judges come from different institutions and have varied educational/evaluation experiences, attitudes, and evaluation cultures, so it is vital to inform them, communicate the goals and expectations related to the judging in advance, and provide feedback on this (actually, the training of the reviewers). In the case of the section the present study examined, this is supported by the professional and ethical guidelines formulated for the contributors and the direct formulation of expectations related to the criticisms.

Excerpt from the professional and ethical directives of the section: “*The reviewers undertake to:*

- *provide meaningful feedback to students participating in the NSRC, thereby acknowledging and assisting the professional and scientific work of students, supporting their development, and encouraging their future scientific work;*
- *act in an unbiased manner, regardless of their specialty, institutional affiliation, professional or methodological commitment/interest, and judge the works to be evaluated according to the same professional-scientific requirements;*
- *During the written and oral evaluation, they try to guide further research with a positive approach and forward-looking advice.”* (Committee of Economic Sciences of the National Council of Student Research Societies, 2018)

Our results confirm the significance of these principles, indicating that it is not merely a formality but a factor influencing student perceptions and, thus, the effectiveness of the talent management process. Therefore, the organizers must communicate these principles and expectations to the reviewers, particularly new reviewers.

In addition to the judging quality, another indispensable element is the atmosphere of the oral round. Ensuring full attention and quality time for oral presentations where high-quality scientific debate can unfold is crucial.

Due to the tight schedule of large conferences, this is a significant challenge from an organizational point of view. The number and size of sessions, the number of papers presented, the number of parallel sessions, the time allocated to one presentation and the debate, and the provision of adequate technical support may be questions. In addition, jury composition, jury member attitudes, and the personality of the jury chairman leading the debate play vital roles in creating an open, supportive, cordial, professional dialogue that ensures equal opportunities. The involvement of experienced jury members, the preparation of new ones, and prior consultation with the juries can support the enforcement of this approach.

Raising awareness and ensuring expectations and value-creating factors related to the judging in the oral round is crucial, as is raising student awareness of the psychological and learning benefits obtainable in the process. Content feedback, professional debate, and responding to criticism all support the development of several essential skills (Koloszár et al., 2024).

Our results confirm research demonstrating that students are fundamentally motivated by processes they perceive as fair. A supportive process perceived as equitable and upright may be more important than any numerical results, scores, or rankings alone. Of course, those who enter a race like to win, but winning does not necessarily entail adequate satisfaction with the process. Feedback communicated in a well-justified, forward-looking manner and partnership dialogue are considered valuable, even in the absence of formal recognition or achievement. Nevertheless, inadequate, frivolous, or incorrect feedback destroys values, kills trust, and reduces the credibility of good outcomes.

Conference results are transferable to other activities evaluated by written feedback, including theses, dissertations, or publications. The content structure of longer written assessments, i.e., constructive and fair assessment, determines the perception of effectiveness and experience along similar processes, which also affects the learning outcome. Providing perceived neutrality and support for voice to reviewers plays an essential role in the positive impact of feedback on perceived success and positive memorable experiences. Therefore, developing the related elements of the process and appropriately communicating these is indispensable, particularly in tasks like thesis/dissertation defense or defining the role of the response written in connection with the publication review towards all stakeholders.

Further research could involve examining the achieved results and student perceptions (fairness, satisfaction), for example, comparing the characteristics of different sections and sessions and exploring their influencing factors in the case of NSRCs. Applying the model in another context, like a thesis defense where students can defend their work, is entirely conceivable.

Overall, perceived fairness makes criticisms and suggestions more acceptable. It also supports overall self-satisfaction and perceptions of the conference experience. For organizers and instructors involved in competitions (or other educational situations), this warrants increased attention to a fair (transparent, consistent, impartial, professionally competent) evaluation process and communicating this dedication to fairness to stakeholders.

CRediT authorship contribution statement

Ariel Mitev: Writing – review & editing, Writing – original draft, Visualization, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **László Koloszár:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Investigation, Formal analysis, Data curation, Conceptualization. **Ágnes Wimmer:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Investigation, Formal analysis, Data curation, Conceptualization.

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Declaration of competing interest

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Appendix

Construct (Rho, AVE, CR)	Item	Mean	Std. Dev.	Loading
Constructiveness of written feedback - higher score ($\rho_A = 0.87$, AVE = 0.72, CR = 0.91)	The textual evaluation of the reviewer with the higher score was sufficiently detailed and professionally developed.	4.46	0.872	0.886
	The evaluation of the reviewer with the higher score was forward-looking and supported the further development of my work.	4.34	0.966	0.901
	The score given by the reviewer who gave the higher score was realistic.	4.47	0.860	0.757
Constructiveness of written feedback - lower score ($\rho_A = 0.93$, AVE = 0.82, CR = 0.95)	I learned a lot from the higher scoring judging.	3.69	1.227	0.837
	The textual evaluation of the reviewer with the lower score was sufficiently detailed and professionally developed.	3.93	1.344	0.908
	The evaluation of the reviewer with the lower score was forward-looking and supported the further development of my work.	3.72	1.392	0.940
Jury neutrality ($\rho_A = 0.86$, AVE = 0.70, CR = 0.90)	The score given by the reviewer who gave the lower score was realistic.	3.42	1.400	0.850
	I learned a lot from the lower score judging.	3.29	1.476	0.915
	I believe that the jury was not influenced by who came from which institution.	3.99	1.305	0.824
Support for voice ($\rho_A = 0.93$, AVE = 0.72, CR = 0.94)	I don't think the jury was influenced by whose mentor it was.	4.26	1.185	0.864
	The jury accepted critical or polemical opinions that differed from his own.	4.11	1.149	0.827
	I feel that the jury made an unbiased decision.	3.90	1.354	0.834
	The oral round was in a good mood.	4.49	0.830	0.821
	At the oral round, an active scientific debate ensued.	3.67	1.274	0.747
	The session jury asked professionally grounded and correct questions.	4.11	1.187	0.881
Perceived effectiveness ($\rho_A = 0.94$, AVE = 0.72, CR = 0.88)	The oral round was of professional quality.	4.19	1.011	0.870
	During the oral round, a forward-looking/supportive professional atmosphere was established.	4.06	1.210	0.900
	The oral round provided assistance for the further research/professional work of the participants.	3.99	1.168	0.861
	In my opinion, I closed the NSRC with a good result.	3.97	1.283	0.909
Positive memorable experience ($\rho_A = 0.88$, AVE = 0.78, CR = 91)	I am satisfied with my own performance.	4.11	1.189	0.888
	I made the most of the situation.	4.47	0.897	0.730
	I will not forget the experience I had here.	4.52	0.873	0.835
	I remember many positive things about NSRC.	4.36	0.991	0.941
	I have wonderful memories of this NSRC.	3.74	1.173	0.864

Note: All items measured by 1–5 where 1 = I disagree at all, 5 = I completely agree. ρ_A : Dijkstra-Henseler's rho, AVE: Average Variance Extracted, CR: Composite Reliability.

Source: own elaboration

Data availability

Data will be made available on request.

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