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EXPLORING THE EFFECTS OF MANAGERIAL BEHAVIOR ON STEM WORKERS' PSYCHOSOCIAL EXPERIENCE

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ABSTRACT. The study intends to disclose the effect of managerial behaviour on the psychosocial experiences of STEM (science, technology, engineering, and mathematics) workers. Using two fundamental approaches to leadership – task-oriented and relationship-oriented behaviours – the paper seeks to reveal what characteristics of the two managerial behaviour styles shape positive and negative experiences of STEM workers'. To characterise employee psychological experiences in the workplace, neuroscience-based Rock's SCARF (status, certainty, autonomy, relatedness, fairness) model was employed. A qualitative method was used, which enables an in-depth understanding of the phenomena. For this purpose, 50 STEM professionals in Lithuania participated in semi-structured interviews to collect qualitative data. The study revealed that status was one of the most sensitive psychosocial experiences of STEM workers, especially when it was positively influenced by managerial behaviour. Meanwhile, the most negative SCARF experiences of STEM workers were related to a reduced sense of fairness and relatedness. Furthermore, the study revealed both relationship- and task-oriented behaviour characteristics that positively or negatively affected the psychosocial experiences of STEM workers. STEM workers experienced more positive SCARF experiences due to the task-oriented behaviours of managers, whereas relationship-oriented managerial behaviour was mentioned more often as a cause of the formation of negative psychosocial experiences. Finally, the paper provides strong support for the assumption that the integration of both managerial behaviour styles ensures effective leadership, combining a goal-driven approach that prioritises efficiency, work organisation, and successful fulfilment of tasks.

JEL Classification: J28, J65,
M5

Keywords: managerial behavior, STEM workers, psychosocial experience, SCARF.

Introduction

Psychosocial experiences at work have a significant impact on employees' emotional and psychological wellbeing, as well as on their motivation and work efficiency. Every organisation's success is built on its motivated, successful, and contented workforce; thus, managers should prioritise making sure that workers have positive psychosocial experiences (Schaufeli, 2015; Antonakis & Day, 2018; Clarke et al., 2024). According to Kossek et al. (2011), managers have the greatest power in organisations and influence all processes and decisions made in them. Moreover, managers play a crucial role in developing psychologically safe workplaces (Clarke et al., 2024). Thus, scholars are seeking to identify the manager behaviours that would ensure positive psychosocial experiences. Diebig and Borman (2020) found that inconsistent, constantly changing, and laissez-faire leadership behaviours led to high levels of daily stress. Another study by these authors (Borman & Diebig, 2020) found that differentiated transformational leadership styles, where leaders treated followers differently, also increased the stress of team members. The current paper focuses on two fundamental approaches to leadership – task-oriented and relationship-oriented behaviours (Antonakis & Day, 2018; Tummers & Bakker, 2021).

Following the follower-centric leadership approach, which supposes that followers are acknowledged as significant actors in the leadership process (Matshoba-Ramuedzisi et al., 2022), different managerial behaviours may be more suited to one or the other type of followers. For instance, Mujtaba's (2023) study revealed that women prioritised managerial behaviour oriented to relationships, while men preferred task-oriented behaviour. According to scholars (Vilčiauskaitė et al., 2020; Šakytė-Statnickė & Savanevičienė, 2023; van Veen et al., 2024), young workers have certain specific work-related needs that differ from those of their older colleagues.

Recently, attention has been increasingly drawn to STEM workers. The European Commission Communication on STEM Education (2025) notes that the EU faces a shortage of qualified STEM graduates that hinders EU competitiveness. Moreover, research shows that in STEM fields, where anxiety and depression have become common problems, more than a fifth of STEM workers take leave due to their mental health (Brite Innovation Review, 2020). This suggests the need for new insights into managerial behaviour that encourages STEM workers, or conversely, makes them feel unhappy and reduces their effectiveness.

The next issue is related to the definition of psychosocial experiences. Scholars in research use various constructs to describe both positive and negative psychosocial experiences: psychological wellbeing, job satisfaction, job stress, and burnout (Kwok, 2020; Hansen et al., 2022; Kim et al., 2023; Clarke et al., 2024; Bouvier et al., 2024 etc.). The paper follows the neuroscience-based Rock's SCARF (status, certainty, autonomy, relatedness, fairness) model (Rock, 2008, 2009). Despite the wide recognition of the SCARF model, both scientific research and practical implications are related to the general behaviour of the individual as a person in everyday life. Thus, taking into account the observations made by neuroleadership experts on the need to assess the context and the recommendation to evaluate the application of the model in practice (Kuhlmann & Kadgien, 2018), there is a lack of knowledge about what kind of managerial behaviour promotes positive psychosocial experiences of employees, and conversely, what kind of managerial behaviour shapes negative psychosocial experiences.

This paper aims to explore the effects of managerial behaviour on the psychosocial experience of STEM workers, focusing on how different managerial behaviours affect their sense of status, certainty, autonomy, relatedness and fairness. To do this, 50 STEM workers were interviewed.

The paper contributes to expanding the knowledge about the way managerial behaviour affects STEM workers' psychosocial experiences. First, the study provides the characteristics of SCARF domains that manifest both positive and negative STEM workers' psychosocial experiences. Second, it identifies managerial behaviours, which are crucial in strengthening or reducing the sense of STEM workers' status, certainty, autonomy, relatedness, and fairness.

1. Literature review

1.1. Outlining STEM Workers' Psychosocial Experiences with the SCARF Model

Employees' psychosocial experiences are described as social and psychological experiences in the work environment (Trumpff et al., 2024). They are shaping the process of social interaction within an organisation, and this affects the attitudes and perceptions of employees (Lee and Kim, 2023). Thus, psychosocial experiences reflect how employees feel in the organisation, what relationships they have with managers and colleagues, and how they perceive other organisational factors that are important for their emotional state (Rugulies, 2019). The spectrum of psychosocial experiences is very wide, but this study is based on SCARF, which can explain the reactions that occur in people's brains when they participate in various social interactions (Rock, 2008). The five dimensions of the SCARF model are autonomy, relatedness, status, certainty, and fairness.

Status refers to one's sense of importance relative to others (Rock and Cox, 2012). It can be understood as the respect, significance, and prestige that an employee feels among colleagues (Djurdjevic et al., 2017; Sekiguchi et al., 2017). When discussing status, Torelli et al. (2014) highlight the significance of social hierarchy and emphasise that it exists in every society and organisation, and people are interested in climbing the ladder of organisational hierarchy and gaining the highest possible status in it. According to Hansen et al. (2022), status is related to an employee's self-perception of how well he or she is doing. Summing up, status, on the one hand, refers to an employee's perceived importance and significance to others, including respect, prestige, and social hierarchy; on the other hand, it refers to an employee's subjective perception of their achievements and value in an organisation.

Certainty is linked to an individual's expectation of having clarity at work and the capacity to predict the future (Rock, 2008; Javadizadeh et al., 2022), which would allow employees to make timely and accurate decisions. Having information that can help make decisions and predict what lies ahead is pivotal to employees' sense of certainty. The manager plays a crucial role in how managers inform employees and how often they communicate and interact with employees (Hansen et al., 2022). Javadizadeh et al. (2022) emphasise the need for clarity in goals and expectations for employees as well as the importance of feedback. Research by van Veen et al. (2024) revealed that young workers frequently experienced stress when they had a temporary contract with no guarantee of contract renewal, making job insecurity a significant issue for them. Hence, a sense of uncertainty is worse than having bad knowledge (Hansen et al., 2022) and that employees who lack certainty about their future in the organisation feel insecure, experience high stress, and consequently experience lower job satisfaction and commitment to their organisation, and are therefore more likely to leave it (Ngirande, 2021). Thus, certainty is related to both psychological safety in the workplace and certainty about their future.

The domains of autonomy and relatedness are mentioned in self-determination theory, which emphasises the symbiosis of three factors—autonomy, competence and relatedness—that make employees feel engaged and motivated. Ignoring these needs leads to demotivation and a decreased sense of self-confidence, and their realisation is an essential assumption for

personal development, self-efficacy, and long-term intrinsic motivation (Ryan and Deci, 2000; Staniec et al., 2023).

Autonomy is related to the feeling of control over life events and the perception that we influence the outcome of a given situation through our behaviour, the ability to control events and the environment (Rock et al., 2008; Rock and Cox, 2012). In the work environment, autonomy refers to the degree to which employees can perform the assigned tasks with appropriate work methods and make independent decisions (Wan and Duffy, 2022). Autonomy can also be understood as the independence of an employee, which allows them to manage their working time and set priorities (Hansen et al., 2020). Employees who are granted autonomy have the opportunity to participate in the decision-making process, which stimulates their creativity and initiative, personal development and increases motivation and job satisfaction. According to Kwok (2020) and Szostek et al. (2024), autonomy encourages employees to identify with their work by seeing its meaning, which leads to greater job satisfaction. Meanwhile, micromanagement has perhaps the most negative impact on the sense of autonomy (Hansen et al., 2020) and can provoke dissatisfaction or even resistance. Thus, autonomy enables employees to work independently and make timely decisions to effectively solve the emerging issues. Moreover, granting autonomy with sufficient personal resources implies a strengthening sense of status.

According to Pardede and Kovač (2023), a sense of belongingness is a fundamental psychological need of every human being because people are interested in belonging to a certain social group and creating emotional relationships with those around them. In the SCARF model, relatedness refers to a sense of connection and similarity with those around them, which determines how much individuals treat their environment as safe or threatening (Rock and Cox, 2012; Hansen et al., 2022). Relatedness is closely linked with the concepts of being in-group or being out-group. Being in-group implies sharing common values and attitudes, while out-groups consist of people who do not share those features (von Hippel, 2006). Summing up, employees who are inside the group and have good relationships with their manager feel greater trust and empathy than those who are outside the group and do not have good relationships with their manager.

Fairness refers to individuals' perceptions of the fairness or unfairness of social exchanges (Rock and Cox, 2012). It is related to both resource allocation, transparent human resource management policies, and interpersonal relationships, including the leader's behaviour with their followers (Spieler, 2024). When employees feel that they are treated fairly and are provided with equal opportunities, they feel more motivated, which positively affects their behaviour and performance. Rock and Cox (2012) point out that employees tend to compare their own and other colleagues' rewards, as well as their efforts and the rewards received for them; therefore, when they feel that they are treated unfairly, employees become demotivated, and their job and satisfaction with the organisation decreases. Hence, managers need to create a work culture that promotes fairness.

Emphasising the importance of employees' psychosocial experiences for their psychological wellbeing and productivity, as well as the part managerial behaviour plays in fostering positive psychosocial experiences, the following chapter provides theoretical insights regarding the effects of managerial behaviour on employees' SCARF domains.

1.2. Rethinking Task- and Relationship-oriented Managerial Behaviour

According to Rock (2009), rewards and threats of the work environment have a significant impact on an employee's SCARF domains, which influence problem-solving, decision-making, motivation, and productivity. Moreover, scholars examining the application

of the SCARF model argue that the behaviour of the leader often determines the threats or rewards perceived by the employee in terms of status, certainty, autonomy, relatedness, and fairness (Rock, 2008, 2009; Rock and Cox, 2012). Additionally, it has been discovered that people react more strongly to threats than to rewards (Rock, 2009). Furthermore, Javadizadeh et al. (2022) argue that the behaviour of the leader can activate the threat reaction in an employee much more easily than the reward reaction.

There has been a long-standing debate about which managerial behaviour is most effective (Henkel et al., 2019; Ibnu Suryo et al., 2024; Jančiauskaitė and Lalienė, 2023). The current paper focuses on two fundamental approaches to managerial behaviour—task-oriented and relationship-oriented behaviours (Antonakis and Day, 2018; Tummers and Bakker, 2021). Task-oriented and relationship-oriented behaviours reflect radically different approaches covering essential managerial behaviour aspects: task performance and employee relationships. By analysing both of these managerial behaviours, we can better understand different managerial behaviour characteristics and their potential effects on employee psychosocial experiences.

According to Tummers and Bakker (2021), task-oriented behaviour is a goal-driven approach that prioritises efficiency, work organisation, and successful fulfilment of tasks. Managers pay a lot of attention to setting goals, discussing the workflow, highlighting which activities are essential and which might be ignored, ensuring deadlines are met, and providing constructive feedback. Hoozeboom and Wilderom's (2019) study revealed that one of the most prominent characteristics of task-oriented behaviour was task performance monitoring, which manifested itself through checking on employees' current task progress, referring to previously made agreements with employees. When employees' performance does not meet the expectations or requirements, a task-oriented manager provides employees with constructive, facts-based feedback and information about necessary improvements to ensure better performance in the future. This way, task-oriented managers not only ensure that employees are properly informed about how their performance is being evaluated, but also aim to improve current performance by providing employees with factual feedback and setting expectations for specific improvements in their performance (Stankevičiūtė et al., 2023). Van der Schaaf et al. (2017) concur that task-oriented managerial behaviour is characterised by fact-oriented feedback and feedback is usually provided as constructive criticism. Nevertheless, task-oriented managers do not shy away from providing negative feedback to employees, identifying unsatisfactory employee behaviour or results, informing them about it, and thus ensuring that undesirable actions are not repeated in the future (Van der Schaaf et al., 2017). However, one should pay attention to scholars' warnings that feedback can pose a threat to an employee's status (Rock, 2009; Kolembe, 2016), especially if it appeals to the employee's professionalism, doubting their competence and abilities. Since task-oriented behaviour is associated with work process monitoring, there is a risk of switching to micromanagement. A study of Van Veen et al. (2024) revealed that it was important for young employees not to feel controlled by their manager, as this made them feel insecure, especially if the young employees themselves were not yet confident in their competence. A study by Savanevičienė et al. (2022) revealed the importance of the dynamics of information formally and informally, which enabled the explanation of the decisions made in organisations, increasing the certainty of employees. Meanwhile, feedback from the manager and recognition of employees are among the main factors mentioned in the literature that can threaten the status of an employee or reward them (Stankevičiūtė et al., 2023), depending on how professionally it is done from the managerial point of view.

Relationship-oriented behaviour is oriented toward a person and is known as “consideration” (Tummers and Bakker, 2021), which means that managers support employees

by asking them how they are doing, providing help when employees want it, and praising them for a job well done. According to Yukl (2012), relationship-oriented managers not only aim to achieve the organisational goals but also to enable employees to realise their personal potential. In doing this, they maintain close interpersonal relationships with employees and provide them with the necessary emotional support. Hoozeboom and Wilderom (2019) highlight such characteristics of relationship-oriented managerial behaviour as demonstrating empathy, fostering a friendly atmosphere, and taking an interest in the thoughts, feelings, and circumstances of followers. Relationship-oriented managerial behaviour involves providing positive feedback and creating a relationship with followers based on mutual trust (Bojovic and Jovanovic, 2020). One of the main characteristics of relationship-oriented managerial behaviour is the attention leaders pay to the development of followers, which various authors identify as one of the main features of relationship-oriented managerial behaviour. Relationship-oriented managers not only assess the current potential of employees to perform specific tasks at a given time, but also are able to predict their growth prospects and possible future responsibilities (Yukl, 2012; Yukl et al., 2019). Such an approach promotes the professional development of employees and helps ensure the long-term success of the organisation, strengthens employees' sense of certainty and status, and creates a feeling of belonging. In the workplace, relationship-oriented behaviour supports the fulfilment of employee needs for belonging, autonomy, and competence growth (Ryan and Deci, 2000) which strengthens the sense of relatedness, autonomy, and status. The opinion of managers is very important to employees; thus, personal praise or public recognition of an employee's achievements strengthens status (Rock, 2009; Kolemba, 2016). However, phenomena such as nepotism and favouritism negatively affect relations and organisational climate (von Hippel, 2006; Vveinhardt and Bendaraviciene, 2022) and reduce the sense of relatedness.

Thus, while task-oriented managing behaviour concentrates on accomplishing tasks and reaching predetermined goals, relationship-oriented managerial behaviour stresses interpersonal relationships, communication, and emotional components. While the former places more emphasis on efficiency and outcomes, the latter promotes teamwork and a human-centred approach. The relationship-oriented managerial behaviour provides a vision and employee involvement, and the task-oriented behaviour is whether giving clear instructions for performance management and ensuring that tasks are completed efficiently (Tummers and Bakker, 2021). Research has revealed that task-oriented managerial behaviour has a greater effect on entrepreneurial orientation and innovation capability than relationship-oriented managerial behaviour (Ibnu Suryo et al., 2024). Meanwhile, Burke et al. (2006) suggested that relationship-oriented behaviours had a slightly greater impact on employees' perceptions of team effectiveness and team productivity and a significantly greater influence on team learning. Mujtaba's (2023) study revealed that women prioritised relationship-oriented managerial behaviour, while men preferred task-oriented behaviour. Finally, a study on project managers revealed that both managerial behaviours were appropriate, but they served different purposes and created different benefits. If task-oriented managerial behaviour was better for ensuring task completion and meeting deadlines, then relationship-oriented leadership positively impacted team cohesion and trust, especially during uncertain conditions (Henkel et al., 2019). Thus, different managerial behaviour approaches and their characteristics may manifest differently in various contexts.

2. Methodological approach

The study was conducted following the Declaration of Helsinki and approved by the Ethics Committee of Kaunas University of Technology (M6-2022-18).

2. Methodological approach

Social reality is not objective; it is shaped by human experience and social context (Alharahsheh and Pius, 2020). Therefore, an interpretive paradigm was used to study the effect of managerial behaviour on the psychosocial experiences of STEM workers. By learning about the subjective experiences of various actors in the same context and interpreting them, it is possible to shape a holistic and contextual understanding of the phenomenon under study. For this purpose, in-depth interviews were chosen to reveal the subjective experiences of STEM workers related to managerial behaviour.

The study used behavioural interviewing based on the STAR method. According to Hartwell et al. (2019), behavioural question types provide an in-depth understanding of past events. Meanwhile, the STAR method is a structured manner of responding to a behavioural-based interview question by discussing the specific situation (S), task (T), action (A), and result (R) of the situation the interviewer asks to describe. This method is focused on the informant's experience and allows for a better understanding of the phenomenon, focusing on specific past events and experiences.

During the interview, the informants were asked to recall all positive and negative experiences related to the five SCARF domains that are affected by managerial behaviour. In case the informants were unable to recall concrete examples of how managerial behaviour affected a particular SCARF domain, they were questioned about the subsequent SCARF domains. An example of questions from an interview is provided in *Table 1*.

Table 1. An example of questions from an interview

SCARF domains	Questions to determine the effect of managerial behaviour on STEM workers' psychosocial experiences
Status	<ul style="list-style-type: none"> Recall a situation when the manager's behaviour strengthened/weakened your sense of status Tell us more about the situation. How did the manager behave in that situation? How did the manager's behaviour affect your status? How did you feel?
The same queries were asked to determine the effects of managerial behaviour on certainty, autonomy, relatedness, and fairness.	

Source: *compiled by authors*

All interviews were recorded and later transcribed, anonymised, and the recordings were then destroyed. Thematic analysis was used to process the data, which aimed at interpreting the text in a structured way, clarifying the main themes. The data were classified into codes and subcodes, enabling deeper analysis of the data. Moreover, the study employed simultaneous coding, which implies that different codes can be applied to the same data. By grouping the data simultaneously into multiple topics or codes, researchers are able to capture the intricacy and interplay of the data.

MAXQDA 24 software was used to code and visualise the data.

Following the Declaration of Helsinki, a research protocol was prepared, which justified the need for the study, defined the purpose and objectives of the study, outlined the requirements for the target group, developed a research plan, described the methods for gathering and analysing research data, described the features and procedure for informing about the study and obtaining informed consent to participate in the study, and explained how the confidentiality of the subjects and the protection of personal data are ensured. The study was approved by the Ethics Committee of Kaunas University of Technology (M6-2022-18).

3. Conducting research and results

The study involved 50 STEM workers aged 40 or younger and with at least one year of working experience. Nineteen informants were male and 31 – female. According to age, the informants distributed as follows: 38% of informants were between 23 and 30 years old and 62% were between 31 and 40 years old. The average interview duration was 56 minutes. The study identified managerial behaviours that had a positive or negative effect on STEM workers' experiences of status, certainty, autonomy, relatedness, and fairness.

3.1. Positive and negative SCARF experiences of STEM workers induced by managerial behaviour

STEM workers' narratives revealed positive and negative SCARF experiences due to managerial behaviour. Positive and negative SCARF experiences grouped by characteristics are presented in *Table 2*.

Table 2. STEM workers' positive and negative SCARF experiences induced by managerial behaviour

Code: Perceived positive SCARF experiences		Code: Perceived negative SCARF experiences	
Subcode	Characteristics, N*	Subcode	Characteristics
Status (N=71)	Feeling like an equal partner, team member (N=6)	Status (N=31)	Non-feeling like an equal partner: hierarchy (N=5)
	Self-confidence (N=12)		Non-recognition (N=6)
	Professionalism (N=15)		Decrease in self-confidence (N=8)
	Recognition (N=18)		Denigration of professionalism (N=12)
	A feeling of leader's trust (N=20)		
Certainty (N=33)	Financial safety (N=1)	Certainty (N=12)	Unemployability (N=2)
	Social safety (N=1)		Not knowing what results are expected or how to perform the task (N=2)
	Employability (N=3)		Uncertainty about the future (N=4)
	Knowing what results are expected or how to perform the task (N=3)		Uncertainty that you can cope with the task (N=4)
	Certainty about the future (N=6)		
Autonomy (N=27)	Certainty that you will cope with tasks (N=19)	Autonomy (N=20)	Lack of freedom in work scheduling (N=2)
	Time management (N=4)		Feeling a pressure to act in a specific way (N=4)
	Independent decision making (N=11)		Lack of freedom in decision-making (N=14)
Relatedness (N=40)	Independent choice of methods and ways of working (N=12)	Relatedness (N=35)	Irritation (N=8)
	Respect to each other (N=6)		Feeling only as a labour force (N=9)
	Manager's empathy (N=17)		No respect for each other (N=18)
Fairness (N=14)	Informal relationship (N=17)	Fairness (N=34)	Lack of financial recognition (N=4)
	Honest behaviour (N=2)		Lack of transparency (N=6)
	General rules for all (N=3)		Reward not based on merit (N=6)
	Reward-based on merit (N=4)		A feeling of underappreciation (N=9)
	Recognition of contribution, efforts (N=5)		Feeling cheated (N=9)

* N- number of mentions.

Source: compiled by authors

STEM workers have gone through many different experiences related to the strengthening or weakening of their sense of status, certainty, autonomy, relatedness, and fairness as shown in *Table 1*.

Sense of status is one of the most frequently manifesting SCARF domains induced by managerial behaviour. STEM employees had a lot of positive experiences that strengthened their sense of status. However, numerous negative experiences regarding the sense of status were mentioned too. It can be noted that these are the same characteristics, only having a different (positive or negative) manifestation. STEM workers are very sensitive to the managerial behaviour that leads to denigration of professionalism and, at the same time, a decrease in self-confidence: “I worked on it, <...> I read up a lot <...>, and then he [the manager] knocked down my motivation, <...>, [he] said that this was bad... done in a wrong way, <...>. I started asking myself why I tried, why I worked... That’s when your status drops when you know you’re less trusted, when you see that your work isn’t appreciated <...>.” (R_8, Pos. 14). The manager’s trust and the recognition of the employee’s professionalism and efforts, on the contrary, increased the self-confidence of STEM workers: “<...> it was quite fun because I understood that he [the manager] believed in my abilities and responsibility. The status itself increased a little.” (R_38, Pos. 13). The employee’s feeling like an equal partner and team member is also important for the sense of status. As one informant mentioned, it is crucial to maintain subordination, but at the same time to feel equal when solving professional issues: “<...> I felt equal to him [the manager], albeit being aware that he [the manager] was higher [in hierarchy].” (R_25, Pos. 6).

The main positive experience of STEM workers that strengthens certainty is knowing that they can cope with tasks. Although there are more components here, such as, for instance, competence and professionalism, which are associated with the sense of status, autonomy, and certainty is ensured when the STEM workers themselves understand that their personal resources correspond to the tasks set, and especially when this is confirmed by the manager: “After completing the task well, [the manager] simply confirms it. <...>. There was a situation when he [the manager] first looked at how I was working and then said, “That’s done, you did it, send it.” He didn’t look at anything but allowed me to send the completed work. It means that the manager doesn’t even check you anymore. This strengthens your sense of certainty. (R_26, Pos. 11).

The degree of independence is the primary characteristic of whether the sense of autonomy is growing or deteriorating: “Autonomy was weakened when, for example, during the probationary period, to put it simply, he [the manager] stood behind me and watched and pointed with their finger at me how to do something.” (R_30, Pos. 22). Where negative experiences were mainly associated with lack of freedom in decision-making, an increased sense of autonomy was associated not only with the possibility of making independent decisions but also with the independent choice of methods and ways of working: “There was a conference; everything was pretty much based on the principle of autonomy because the goals were stated. We were left to figure out how to accomplish things, which was great because we could handle everything on our own. I could contribute more myself, add some personal touches, and do something myself.” (R_21, Pos. 18).

The sense of relatedness manifests through the extent to which an employee feels or does not feel part of the team. The role of the manager is critical here, emphasising the manager’s sense of respect for the employee (R_4; R_15; R_49, etc.) and informal relationships with the manager, not being afraid to ask if something is unclear (R-1; R_23; R_46, etc.), or simply talking about things other than work (R-17; R_33, etc.). Furthermore, the manager’s empathy is relevant for employees: “<...> There was a car accident. I was amazed by her [manager’s] words when she asked me, ‘Are you okay? Are you okay?’” “Yes, I’m okay.” “If

you're okay, then all is fine, the car is just a pile of metal, there is insurance, we'll fix everything, don't worry, and don't feel guilty." So I understood that our leader was such a...well, an empathetic person who understands you and supports you in a stressful situation." (R_1, Pos. 27).

STEM workers perceive fairness in two ways. First, it is related to the fairness and transparency of the organisation's policy and its implementation mechanism, for instance: "If there is some kind of employee evaluation system, then when it is public and transparent, everyone can see what they have to do and how they will be evaluated; when there is such a clear system, then fairness is strengthened" (R_26, Pos. 28). Second, it is related to the manager's personal attitudes and behavioural norms, how honestly they behave in different situations.

3.2. *Manifestation of managerial behaviour that affects STEM workers' SCARF experiences*

Managerial behaviour, which affects positive and negative psychological experiences of STEM workers, was categorised into task-oriented and relationship-oriented behaviour based on scientific literature. *Table 3* provides the characteristics that were revealed during the study and assigned to each behavioural orientation of the manager.

Table 3. Managerial behaviour that impact on STEM workers' psychosocial experience

Code: Positive managerial behaviour		Code: Negative managerial behaviour	
Subcode	Characteristics, N*	Subcode	Characteristics
Task-oriented managerial behaviour (N=107)	Feedback (N=1)	Task-oriented managerial behaviour (N=55)	Unclear task formulation (N=1)
	Clear task formulation (N=3)		Delegating a task to another (N=2)
	Involvement in decision-making (N=3)		Assigning extra tasks (N=3)
	Providing strategic information (N=3)		Breaking promises (N=5)
	Financial recognition of achievements (N=4)		Manager avoids responsibility and solutions (N=8)
	Goal oriented coaching (N=12)		Lack of managerial support (N=9)
	Mutual communication (N=14)		Micromanagement (N=13)
	Job enrichment (N=20)		Lack of information, communication (N=14)
	Employee support (N=23)		
	Empowerment to make independent decisions (N=24)		
Relationship-oriented managerial behaviour (N=67)	Admitting the manager's own mistake (N=1)	Relationship-oriented managerial behaviour (N=80)	Nepotism (N=1)
	Humour (N=2)		Favouritism (N=2)
	Open-minded (N=4)		Not caring about the employee (N=4)
	Encouragement (N=8)		Pressure (N=5)
	Taking into account the opinion of employees (N=8)		Lack of appreciation for efforts (N=6)
	Organizing joint activities outside of work hours (N=12)		Mobbing (N=9)
	Public/ individual praise (N=13)		Impolite behaviour (N=11)
	Employee care (N=19)		Not taking into account the opinion of employees (N=12)
			Reproaches (N=14)
			Demonstration of formal authority (N=16)

* N- number of mentions.

Source: *compiled by authors*

As can be seen from Table 1, task-oriented managerial behaviour is crucial in shaping positive SCARF experiences of STEM workers'. The most manifested characteristics were empowerment to make independent decisions, employee support, and job enrichment.

According to the informants, empowerment to make independent decisions shows that managers trust the professionalism of employees and value their responsibility, allowing them to work independently thus strengthening the sense of status and autonomy: “I have enough autonomy at work. The most important thing is the result, and you can plan what and how to do it yourself; the manager does not interfere.” (R_46, Pos. 28). By giving employees the freedom to act, managers must also ensure employee support. This forms a sense of certainty: “When you notice something... you just sit [with the manager] at the same table, whether in a formal or informal conversation, and talk about what is wrong. That understanding and support <...> [the manager] said, “I understand... We have time; let’s observe and only then do something.” His words helped me a lot.” (R_7, Pos. 37). STEM workers also pay great attention to job enrichment as recognition of their status, both from their personal and manager’s perspectives. Job enrichment provides employees with more responsibility for their work, greater decision-making freedom, and a variety of tasks to increase the diversity of their work and promote personal growth: “Involvement in projects, in new tasks, when the manager allowed me to grow. There was even more gratitude and loyalty because they see you in one function and position but give you more and more complex ones, and you understand that you have the opportunity to grow and improve and move up the career ladder, and at the same time earn money, so I appreciate that.” (R_10, Pos. 17).

The most evident characteristics of relationship-oriented managerial behaviour shaping positive SCARF experiences of STEM workers were employee care, public and individual praise, and organising joint activities outside of working hours. Employee care is pivotal in ensuring STEM workers’ certainty, but at the same time, it forms a sense of belonging and strengthens relationships with the manager: “My health was failing, but I felt support from the manager. <...> It was a certainty when you realise you are needed, you have to not give up and keep doing the work. You understand that you are still needed and valued. That also gives <...> such a feeling of human connection.” (R_37, Pos. 12). Public or individual praise strengthens the sense of status through recognition of professionalism. Moreover, praise from managers affects the sense of relatedness as well: “I have had managers who simply praise you for things you have done well. I think it is a simple but very useful thing, especially when you are young and don’t have much confidence in yourself, so those simple things really help.” (R_29, Pos. 7). Recognition of managers is very important for STEM workers. Although praise is very important, simply taking the employee’s opinion into account is no less relevant: “I had a manager who never praised, but from the way he behaved, I felt that he trusted me. This included assigning more complex tasks and sometimes just consulting, asking for your opinion. Somehow it really caresses your vanity, because I respected that manager very much and the fact that he asks for your opinion; your self-esteem grows because you understand that others recognise that you are capable of something.” (R_49, Pos. 8). Finally, relationship-oriented managerial behaviour contributes greatly to the formation of positive relatedness experiences. Organising joint activities outside working hours fosters stronger interpersonal connections, enhances trust, and promotes a sense of belonging, all of which contribute to positive relatedness experiences among team members: “Organising after-work meetings improves team relationships, not just in terms of work.” (R_30, Pos. 27). Teambuilding (R_25), organising Christmas events and summer parties (R_22, R_46), joint picnics or meetings outside work (R_23, R_50, etc.) improve cooperation and promote a positive work atmosphere.

STEM workers also identified numerous characteristics of managerial behaviour that shape negative SCARF experiences. Task-oriented managerial behaviour characteristics such as micromanagement refer to a situation where the manager over-controls the employee’s activities, not giving them enough time to complete tasks independently. The manager often does not allow the employee to prove their abilities and becomes impatient if the task is not

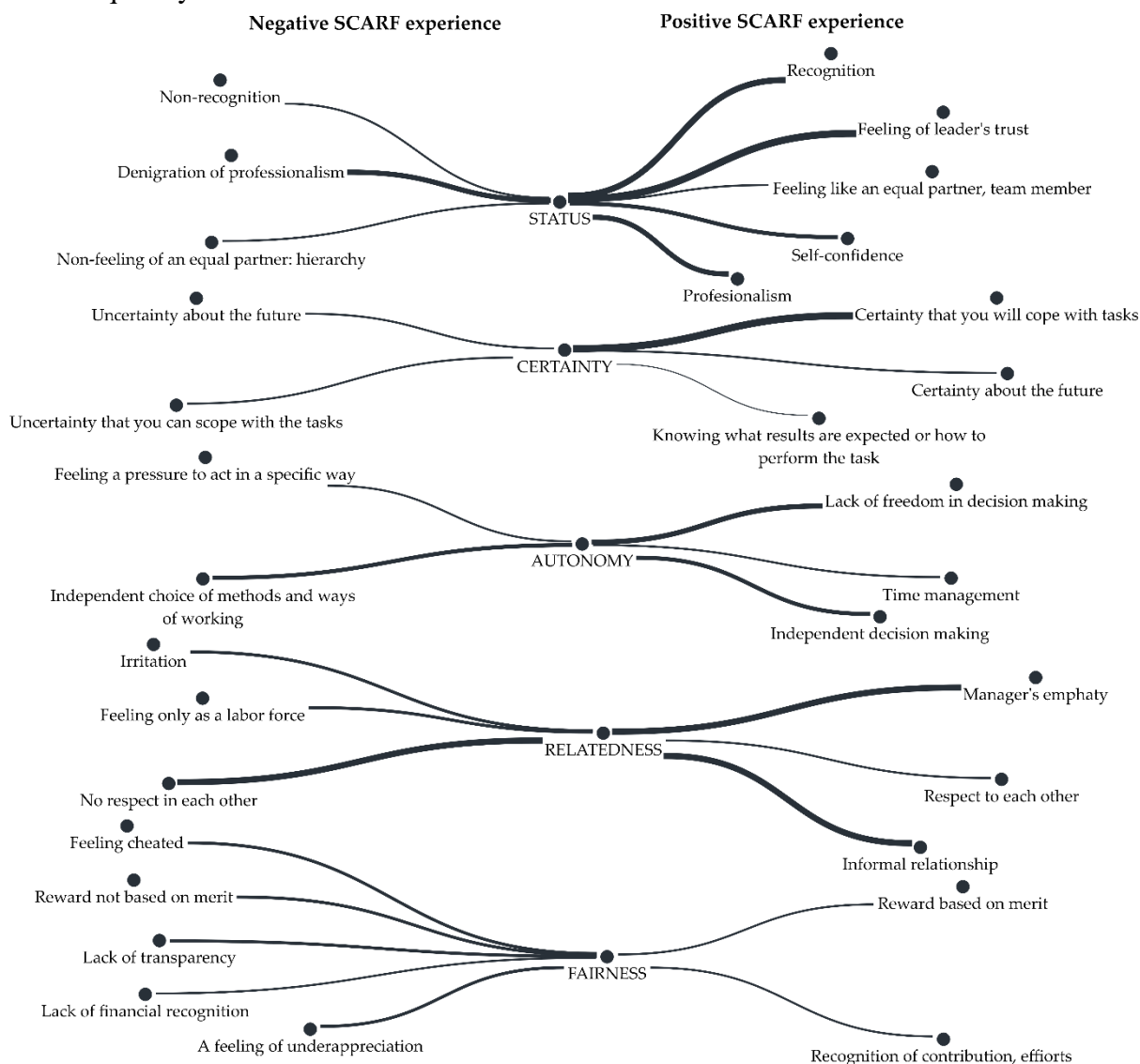
completed quickly or according to their expectations. Such managerial behaviour reduces the employee's autonomy and harms their sense of status: "When the manager supervises you at every step, sometimes even, as they say, does not allow you your own space in the workplace. This even reduces your desire to work as an employee and your self-confidence and does not allow you to make decisions independently. The lack of autonomy destroys me as a person in most cases." (R_23, Pos. 24). Lack of information and communication is crucial for a sense of certainty and also has a negative impact on relatedness and raises doubts about fairness: "The manager does not communicate, does not say how things are going. Then you hear some rumours, and all of a sudden you become very insecure and uncertain about your future." (R_10, Pos. 12). STEM workers also feel negative psychosocial experiences due to a lack of managerial support, which especially reduces their sense of status (R_45, R_46, etc.), and managers' avoidance of taking responsibility for solutions especially harms relatedness and sense of certainty (R_23, R_33, etc.).

The study showed that relationship-oriented managerial behaviour can result in negative experiences for STEM workers too. Disregarding the employees' opinion reduces the sense of status: "Sometimes you have to keep proving your competence for a long time. Once you start expressing your opinion and immediately see the reaction – there is a rejection, if it does not coincide with the opinion of the manager. You simply see that you are not interesting to the manager." (R_41, Pos. 9). Reproaches and criticism from the manager negatively affect the SCARF experience of STEM workers; they reduce their status because constant reproaches hinder the employee's confidence in their abilities and self-esteem. In addition, reproaches create uncertainty because the employee is not clear about what exactly is expected of them. Moreover, reproaches are usually based on an emotional state, forgetting the facts, which causes frustration and reduces the sense of fairness of STEM workers', especially when they are expressed publicly: "Public reproaches, I would even say public scolding... This is really demeaning, not only because it humiliates me in front of other colleagues, but also because it makes them not trust me." (R_10, Pos. 12). Demonstration of formal authority reduces employees' sense of status, causing a feeling that they are less valued, not recognising their professionalism. Simultaneously, it limits autonomy when employees do not have the opportunity to make decisions or express their opinions. In addition, employees feel misunderstood and not related to decisions made without their involvement, which weakens the sense of relatedness and fairness: "[The manager] used to order them to make decisions that may be correct in theory, but in practice very often go beyond and are useless. When I spoke from my practical side (because in that sense, my strong side was practical), the manager said, "Don't explain; we'll still do it as I said, because I'm the manager," and so on... It turns out that we work much harder, walking around in circles until we achieve the same result, and burn resources—both time and sometimes even financial—because decisions are made to repeat the same work five times." (R_6, Pos. 6).

3. Discussion

The study aimed at exploring the effects of managerial behaviour on STEM workers' psychosocial experience. In doing this, 50 STEM workers were interviewed. The study revealed the most vulnerable characteristics of status, certainty, autonomy, relatedness, and fairness and disclosed the characteristics that manifested positive SCARF experiences. Moreover, managerial behaviour that is crucial for shaping STEM workers' psychosocial experiences was identified during the study. STEM workers' positive and negative SCARF experiences induced by managerial behaviour are provided in *Graph 1*. Only the SCARF domain characteristics that

STEM workers have cited at least three times were included in the graph. The lines' thickness reveals how frequently the characteristics were mentioned.



Graph 1. STEM workers' positive and negative SCARF experiences induced by managerial behaviour

Source: *compiled by authors*

As can be seen from Graph 1, STEM workers' sense of status was most reduced by the denigration of professionalism. Meanwhile, the sense of status was strengthened when STEM workers felt trust from managers, were recognised and felt professional. In the scientific literature, status refers to one's sense of importance relative to others (Rock and Cox, 2012) or reflects the employee's self-perception of how well they are doing (Hansen et al., 2022). The present study suggests that the most important emphasis for STEM workers when talking about status is the perception that they felt and were recognised as professionals.

Furthermore, the results of the study are in line with the research on the importance of the capacity to predict the future (Rock, 2008; Javadizadeh et al., 2022) in ensuring workers' certainty. However, the study showed that both certainty and uncertainty had a particularly significant impact on how well an employee could cope with the task. The need for certainty at

the workplace means that STEM workers focus on the importance of their competencies and abilities as a prerequisite for a positive experience at work. Moreover, informants' frequent mention of the ability to cope with the tasks and challenges posed to them correlates with the importance of professionalism and a sense of status.

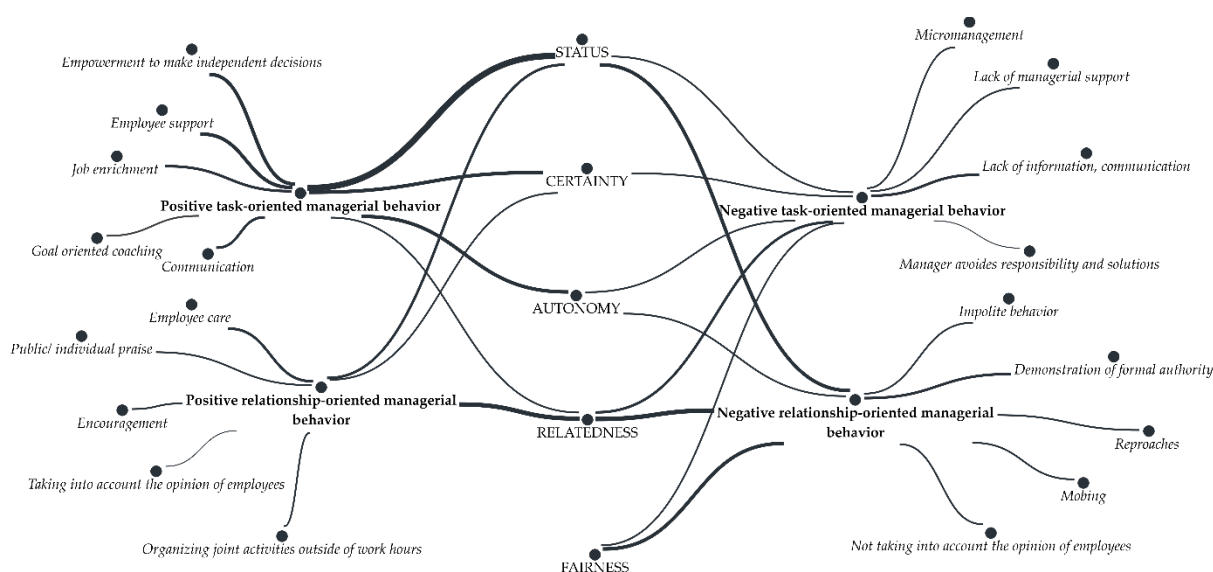
Turning to autonomy, the study confirmed two characteristics that are usually mentioned in academic literature when describing the autonomy domain: independent decision-making and choosing methods and ways of working (Rock et al., 2008; Rock and Cox, 2012; Wan and Duffy, 2022). Nevertheless, STEM workers identified feeling pressured to act in a specific way as a negative experience, while self-management of time also manifested itself as the sense of autonomy.

Pardede and Kovač (2023) mention that the sense of belongingness is a fundamental psychological need. In addition to typical relatedness characteristics, such as respect and informal relationships (Rock, 2008, 2009; Rock and Cox, 2012), the study revealed many variations in how STEM workers perceived relatedness, which expands the content of this SCARF domain. STEM workers either do not feel relatedness when they are treated as a workforce, or they feel irritation. Meanwhile, managerial empathy presupposes the sense of belonging.

The research revealed a wide variety of negative experiences that define the sense of unfairness. Alongside classic fairness characteristics such as fair social exchange and transparency (Rock and Cox, 2012), STEM workers named very personal states, for instance, feeling cheated or feeling of underappreciation.

In summary, the study revealed that all SCARF domains were induced by both positive and negative experiences. However, STEM workers reported positive experiences that were most often associated with their sense of status almost twice as often as positive SCARF experiences associated with other SCARF domains. Meanwhile, negative experiences were mostly associated with the decrease in their sense of relatedness, fairness, and status.

Managerial behaviour that affects the STEM workers' SCARF experiences is provided in *Graph 2*. Only the SCARF domain characteristics that STEM workers have cited at least five times were included in the graph. As previously stated, the thickness of the lines indicates how often the characteristics are referenced.



Graph 2. Managerial behaviour that affects the STEM workers' SCARF experiences

Source: *compiled by authors*

Taking into account that different managerial behaviour approaches and their characteristics may manifest differently in various contexts (Burke et al., 2006; Henkel et al., 2019; Mujtaba, 2023; Ibnu Suryo et al., 2024), this study reveals managerial behaviour that shapes positive or negative psychosocial experiences of STEM workers. Graph 2 shows that both task-oriented and relationship-oriented managerial behaviour shape STEM workers' positive and negative psychosocial experiences. However, it is noteworthy that task-oriented behaviour was more frequently cited as a contributing factor to the development of positive psychosocial experiences, whereas relationship-oriented managerial behaviour was mentioned more often as a cause of the formation of negative psychosocial experiences. This is partly in line with the results of the study by Ibnu Suryo et al. (2024), which found that task-related managerial behaviour had a greater impact on the formation of innovation capability because the nature of STEM workers' activities is related specifically to innovations, their creation, implementation, and management.

It is noteworthy that when mentioning positive status-related experiences, respondents tended to refer more to task-oriented managerial behaviour, whereas when mentioning negative status-related experiences, relationship-oriented managerial behaviour was more emphasized. The characteristics of task-oriented behaviour were often described as forming the sense of certainty and autonomy, but they had a smaller effect on forming the sense of relatedness. Meanwhile, relationship-oriented behaviour contributed significantly to the formation of positive relatedness-related experiences and also had an impact on ensuring status and certainty. These findings support the results of Henkel et al. (2019), confirming the assumption that the integration of both managerial behaviours ensures effective leadership, combining a goal-driven approach that prioritises efficiency, work organisation, and the successful fulfilment of tasks (Tummers & Bakker, 2021) with enabling employees to realise their potential (Yukl, 2012).

Although certain negative characteristics of task-oriented managerial behaviour were mentioned as having formed a negative sense of status, certainty, autonomy, relatedness and fairness, relationship-oriented managerial behaviour had a stronger effect on the formation of negative SCARF domains, except for certainty.

The present study expanded the understanding of which managerial characteristics affect the formation of psychosocial experiences. In addition to task-oriented managerial behaviours such as employee support, communication, and goal-oriented coaching, which are widely mentioned in the scientific literature (Hoozeboom & Wilderom, 2019; Stankevičiūtė et al., 2023), the study revealed job enrichment as one of the characteristics of task-oriented managerial behaviour, which has not been emphasised in previous studies, but is very important for STEM workers, especially in strengthening their sense of status. When it comes to negative psychosocial experience-forming task-oriented managerial behaviour characteristics, lack of information and communication, lack of managerial support, and the threat of micromanaging were often mentioned in the scientific literature (van Veen et al., 2024). STEM workers also identified behaviours that had a negative impact on the formation of SCARF experiences, especially fairness, namely the manager's avoidance of taking responsibility and non-acceptance of decisions.

Characteristics of relationship-oriented behaviour that form positive psychosocial experiences were reflected in the establishment of a personal employee-manager relationship: through employee care, taking into account their opinion and encouraging them. Moreover, STEM workers valued the contribution of managers in creating a positive and friendly microclimate and forming a team spirit. Characteristics of negative relationship-oriented behaviour were related to the demonstration of formal authority, which reduced employee autonomy, and disrespectful behaviour, which especially weakened the sense of relatedness.

Conclusion

The paper's findings disclose the crucial role of managerial behaviour in shaping the psychosocial experiences of STEM workers. The study revealed that workers experienced more positive SCARF experiences due to the task-oriented behaviours of managers. Meanwhile, relationship-oriented managerial behaviour was mentioned more often as a cause of the formation of negative psychosocial experiences. Based on the study findings, the paper provides strong support for the assumption that the integration of both managerial behaviours ensures effective leadership, combining a goal-driven approach that prioritises efficiency, work organisation, and successful fulfilment of tasks.

The paper expands scientific knowledge on the understanding of how the SCARF paradigm might be used for STEM workers. First, the study revealed the essential characteristics of status, certainty, autonomy, relatedness, and fairness, experienced by STEM workers due to managerial behaviour. Moreover, the results of the study identified critical managerial behaviours that strengthened, or, conversely, weakened the sense of SCARF domains.

These findings have practical implications. Managers are encouraged to pay attention to the characteristics of managerial behaviour that foster positive psychosocial experiences and incorporate them into their day-to-day practices. It is also necessary to consider the characteristics of managerial behaviour that reduce the sense of status, certainty, autonomy, relatedness, and fairness. Managers should critically evaluate their behaviour with employees and eliminate these negative manifestations of managerial behaviour. Moreover, the results of this study pose certain challenges to managers, encouraging them to integrate task-oriented and relationship-oriented behaviour approaches and apply them together to ensure effective process management and the achievement of organisational goals as well as personal self-realisation and growth of STEM workers to ensure the achievement of individual goals.

There are certain limitations to the study that suggest areas for further research. STEM workers were the target group of the present study. Although this allowed concentrating on particular facets of this target group, the nature of activities also makes it appropriate to carry out the research with other target groups. This way, it would be possible to find out the extent to which the nature of the work determines the manifestation of managerial behaviour and its impact on the psychosocial experiences of employees. In addition, the behaviour of the manager is only one of many factors of the work environment that influence the STEM workers' psychosocial experiences. Therefore, it is appropriate to study other factors that influence the STEM workers' sense of status, certainty, autonomy, relatedness, and fairness.

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