

# **Capturing language disparity: Considerations for theory and practice**

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Résumé de l'article

La langue peut être considérée comme une ressource quantifiable et précieuse. Au sein d'un groupe, elle peut également représenter une source d'inégalité si certains membres de l'équipe ont accès à l'information et sont capables de s'engager dans des interactions sociales tandis que d'autres ne le peuvent pas. Cette étude méthodologique vise à proposer un nouvel outil de mesure – le *Matiti index* – pour mesurer la disparité linguistique de manière précise et pratique. Son opérationnalisation est illustrée à partir d'une base de données unique collectée lors d'une étude empirique rassemblant 21 équipes féminines de football de haut niveau. Cet article soulève des implications à la fois méthodologiques et pratiques.

# Capturing language disparity: Considerations for theory and practice

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Captando la disparidad lingüística: consideraciones para la teoría y la práctica

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## ABSTRACT

Language is a quantifiable and valuable resource to possess. It can also represent a source of inequality within a group, where some team members would have access to information and be able to engage in social interactions whereas others would not. This methodological and empirical study aims at introducing a new index – the *Matiti index* – to capture language disparity in an accurate and practical way. An illustration of how this index can be operationalized to inform research is provided by relying on a unique database collected during an empirical study gathering 21 high-level women football teams. This article highlights both methodological and practical implications.

Keywords: Language, Inequalities, Palma Ratio, Teams, Sport

## Résumé

La langue peut être considérée comme une ressource quantifiable et précieuse. Au sein d'un groupe, elle peut également représenter une source d'inégalité si certains membres de l'équipe ont accès à l'information et sont capables de s'engager dans des interactions sociales tandis que d'autres ne le peuvent pas. Cette étude méthodologique vise à proposer un nouvel outil de mesure – le *Matiti index* – pour mesurer la disparité linguistique de manière précise et pratique. Son opérationnalisation est illustrée à partir d'une base de données unique collectée lors d'une étude empirique rassemblant 21 équipes féminines de football de haut niveau. Cet article soulève des implications à la fois méthodologiques et pratiques.

Mots-Clés : Langue, Inégalités, Ratio de Palma, Équipes, Sport

## Resumen

La lengua se considera un recurso cuantificable y valioso. La lengua puede también representar una fuente de desigualdad dentro de un grupo, en el que algunos miembros del equipo tendrían acceso a la información y podrían participar en interacciones sociales, mientras que otros no. Este estudio metodológico pretende introducir un nuevo índice – el *Matiti index* – para captar la disparidad lingüística de forma precisa y práctica. Su operacionalización se ilustra a partir de una base de datos única recogida durante un estudio empírico que reúne a 21 equipos de fútbol femeninos de alto nivel. Este artículo pone en relieve las implicaciones tanto metodológicas como prácticas.

Palabras Clave: Lengua, Desigualdades, Ratio de Palma, Equipos, Deporte

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As predicted by Williams and O'Reilly (1998) more than 20 years ago<sup>1</sup>, one main challenge of the XXIst century for organizations and managers is cultural diversity as a result of an increasingly diverse workforce. Professional sports do not escape this phenomenon and has even been described as a perfect “*labor market laboratory*” (Kahn, 2000) when it comes to exploring the outcomes of such multicultural environments. In this sense, Andreff (2009) compared football teams to large transnational firms, based on its expanding internationalization (e.g., expatriate players, foreign owners, international media coverage). In fact, professional football has become a “*truly global labor market*” (Brandes *et al.*, 2009) since the Bosman verdict (1995)<sup>2</sup> allowed clubs to recruit players from every country in the world. As a strong symbol of the high degree of internationalization of the football market’ women’s football teams are now following the same path. The percentage of minutes played by expatriate women players has risen from an average of 21.6% in 2017 to 30.9% in 2022 in the world’s top ten women leagues, and as high as 50% in some teams (Poli *et al.*, 2022).

While the field of management has been capitalizing on the context of sport as a relevant case for investigating the effects of cultural diversity on group and individual functioning (e.g., Brandes *et al.*, 2009; Maderer *et al.*, 2013), the existing sport psychology literature remains limited on this topic (Godfrey *et al.*, 2020). Yet, there is a need to develop a deeper understanding of cultural diversity and move toward cultural competence (e.g., awareness of one’s own social position and its impact on data) in sport and exercise psychology (Quartiroli *et al.*, 2020). Indeed, although managers and players are confronted with cultural diversity on a daily basis, they do not necessarily have the resources and tools to live, work and perform effectively with and through it (Eluère *et al.*, 2022a; Eluère *et al.*, 2022b). More importantly and regardless of the context, cultural diversity inevitably leads to at best, “*a tension between a so-called dominant population that struggles to integrate an otherness and conversely*” (Le Loarne-Lemaire, 2019, p. 168). At worst, it can generate inequalities and discriminations from the recruitment phase (e.g., resume screening process) to corporate or sports club life (e.g., pressuring stereotypes; Massao & Fasting, 2010; Mouillot & Le Barazer, 2020). Eventually, cultural diversity induces an overall work ethic

that may be threatened if professionals working with diverse populations have not developed a certain sense of awareness of their own assumptions (i.e., Quartiroli *et al.*, 2020). In fact, cultural sport psychology scholars have stressed the need to “*remember that culture and cultural relationships involve power and privilege. [...] to understand culture, we must consider who makes the rules and who is left out.*” (Gill & Ryba, 2014, p. 4). As such, it is necessary to go beyond the recurring observation of a growing cultural diversity within professional sport teams, provided by numerous reports on international transfers, to understand how cultural diversity could result in disparities among sport teams’ members, here within football teams.

This echoes the equality/diversity tension naturally brought up in every human group through issues like living together and the relationship to the other (Chanlat *et al.*, 2013). In summarizing the growing body of work on diversity management, Chanlat and colleagues (2013) reiterate how updated managerial strategies can make the organization more effective by making the most of differences, while preventing exclusion and discrimination. However, the variance in definitions and findings of cultural diversity within the literature is a current barrier to advancing this line of inquiry. Apart from a general comparison of the benefits and drawbacks of cultural diversity across a variety of settings (e.g., increased creativity and productivity vs. source of conflict and prejudice), the inconsistency of results makes it difficult to identify practical recommendations. In a recent scoping review, Godfrey and colleagues (2020) noted the ambiguity regarding the definition, conceptualization, and therefore measurement of cultural diversity across the fields of organizational and sport psychology. The same observation was made by Harrison and Klein (2007): “*Differences are a challenge. Organizations have struggled to embrace and manage them successfully. Researchers have struggled to conceptualize and study them effectively*” (p. 1199). To our knowledge, the literature has not always provided rigorous methodological tools suited to the quantitative measurement of cultural diversity, and especially when it comes to the asymmetries created by the latter. This can be explained by the largely positivist tradition to which the field of cross-cultural management is confined, leading it to focus primarily on the efficiency of cross-cultural situations and less on the dismantling of cultural domination for example (i.e., critical paradigm) (Romani *et al.*, 2018). Yet, for members of a football team or any organization, mastering the cross-cultural interactions and communications comes in different forms.

1. In line with a long tradition of work on cross-cultural management (Romani *et al.*, 2018) as well.

2. The Bosman verdict is a decision of the European Union Court of Justice.

Language, as the primary tool of expression in social interactions, is one of the most distinctive attributes of cultural diversity. Within organizations, language diversity significantly influences co-workers' relationships and work effectiveness (e.g., negotiations, brainstorming, cooperation) through national but also corporate and profession-related languages (Church-Morel & Bartel-Radic, 2016). Similarly, professional sport teams, as linguistically diverse as they may be, represent a context requiring a particularly high degree of task interdependence and efficient communication between teammates and with coaches, both on the field (e.g., coordination in order to defend together, technical feedback between teammates) and off (McEwan & Beauchamp, 2014, for a model of teamwork in sports). For communication to be efficient, the language resource depends on the language spoken by the coach (i.e., "*manager language profile*") and the within-team's most spoken language (i.e., "*weight of the majority*"; Church-Morel & Bartel-Radic, 2016). This is consistent with recent findings from Eluère and colleagues' (2022a) qualitative case study where athletes' perceptions of cultural diversity were explored regarding teammates interactions and team functioning. Deliberately choosing not to formulate any initial hypothesis, they found language to be a source of disparity.

The aim of the present paper is to deepen the understanding of cultural diversity through the combination of positivist and critical paradigms (Romani *et al.*, 2018) by measuring language disparity within high-level women football teams. The primary objective of this methodological article is to introduce a novel index to specifically capture language disparity.

Disparity captures the inequality generated by the distribution of a resource of interest between all team members (Bell *et al.*, 2011). Minimum language disparity suggests a low differentiation in language-related status among individuals in an organization. This is either because individuals have similar language skills or because the differing levels of language proficiencies do not result in increased power for the people who have them. Maximum language disparity suggests strong differentiation among members in the distribution of power and status related to language proficiency (Harrison & Klein, 2007). It might be one or a few individuals holding all the resources, while one or a few others are deprived of it. Another form of disparity that may be as impactful (especially in terms of group dynamics) is a team in which the majority of players

are able to speak the language spoken by teammates and staff and just one or two individuals cannot (e.g., Eluère *et al.*, 2022a; Hinds *et al.*, 2014).

Analyzing the language diversity as disparity alongside other attributes of cultural diversity (e.g., national variety) provides a more detailed context about the value of language as a resource. For instance, Gaibrois & Nentwich (2020) highlight how English proficiency might represent a privilege in the specific context of a multinational corporation. However, we found the path from theory to practice (i.e., from conceptualization to operationalization) to be problematic regarding language disparity. General indicators already exist to capture certain types of disparity, such as the variation coefficient or the *Gini index/coefficient* (Gastwirth, 1972) to refer to an economic tool. However, although they are advanced for the measurement of certain types of disparity (e.g., salary disparity), they might not be sensitive enough to entirely capture the span of language disparity in sport teams.

This issue arose while elaborating the protocol of a longitudinal project that we conducted with the support of the UEFA Research Grant Program<sup>3</sup> and the *Cellule Performance* of the French Federation of Football (FFF) (Eluère *et al.*, 2021). The aim of this empirical study was to compare the effects of more or less culturally diverse sport team compositions (i.e., in terms of languages and nationalities) on their group functioning (e.g., teamwork) and structures (e.g., leadership). While measuring national variety was straightforward, properly capturing the disparities created by the diversity of languages proved to be a challenge. This led to a necessary interdisciplinary collaboration between the fields of sport psychology, management and economics to ultimately create the tool we needed (i.e., to translate and operationalize the realities of language diversity in professional sport). We also believed this was a tool presently missing from the literature that other scholars could use when considering language as a resource or a privilege to own (i.e., resource-based view of language).

Although this project originated in the field of sport psychology, the contributions presented have also been reflected in a wide variety of fields including economics (e.g., Ginsburgh & Weber, 2020), sociology (e.g., Bourdieu, 1977), international business (Horn *et al.*, 2020), diversity management and organizational psychology

3. This research project has received a grant from the UEFA Research Grant Program 2020–2021 in partnership with the FFF. This grant program is part of the Union of European Football Associations Academy (UEFA Academy).

(Chanlat *et al.*, 2013). The resulting methodological contributions are intended to be useful and applicable to the various fields in which the measurement of language disparity is an issue (e.g., organizations).

This article is structured as followed: firstly, a brief overview of the literature is presented regarding the analysis of language diversity in sport teams and language disparity in work groups. Then, grounded within the existing calculations and their identified limits, we detail step by step our methodological approach to propose a new index to capture the language disparity. Finally, we illustrate our reflections by applying the *Matiti index* to the cases of 21 high-level women football teams representing a range of language disparity situations, crossed-analyzed with a range of national variety situations.

## Literature review

### Language diversity as an attribute of cultural diversity in sport teams

One main aspect of professional sport, in line with the recruitment of players based on their skills, availability and market value, is a multilingual working environment (Chovanec & Podhorna-Policka, 2009). Although communication is a key element of teamwork and performance in sport (McEwan & Beauchamps, 2014), players are not necessarily language professionals, in comparison to business contexts, for example. Consequently, language diversity within football teams represents a challenge, while the (non)-mastery of the *lingua franca*<sup>4</sup> (i.e., within-group shared language) (Seidlhofer, 2013) can either become an asset or a weakness for team members (Lavric & Steiner, 2012).

As an illustration, Eluère *et al.* (2022a) initially investigated cultural diversity through the lens of national and racio-ethnic variety. Focusing on individual experiences, athletes of a professional volleyball team in France discussed their definition of cultural diversity and its associations with team functioning and teammate interactions. Results revealed the presence of national cliques that participants described as a “*comfort thing*” largely due to shared language. Furthermore, language was positioned as a source of power and inequality within the group. For instance, certain expatriate athletes could not understand the coach’s instructions during training and video sessions as he would quickly

and naturally switch to French even after starting with English as a *lingua franca*. One player described feelings of isolation and was largely perceived as “*weird*” by her teammates when she was the only one who could not communicate fluently in either French or English as the *lingua franca*. Conversely, participants also discussed how efforts to learn and share a language could proactively contribute to social integration (Eluère *et al.*, 2022a). In international business, language differences were historically ignored or subsumed under cultural differences (Horn *et al.*, 2020). However, the lack of a shared language is starting to be recognized as a specific and significant barrier to cross-cultural management, especially in terms of communication (Karhunen *et al.* 2018). In their large-scale quantitative study, Harzing and Pudelko (2014) found the language barrier led to misunderstandings and conflicts in organizations. They also stressed the need to look at those language asymmetries as a specific concept independent from other type of socio-demographic differences in order to facilitate the investigation of its role as a resource. Generally, pioneering work about multilingualism opened the “*black box*” of language by highlighting how it infiltrates a wide range of processes in multinational groups (e.g., knowledge transfer, coordination, communication) (Horn *et al.*, 2020). A thorough understanding of the role of language within a team will both help clarify and discriminate the effects of cultural diversity for managers in many multinational contexts (Horn *et al.*, 2020). The present study specifically examines language as a resource, while considering the multinational context.

### How language diversity in football teams has been studied so far

Those who described language asymmetries in sport teams previously, especially in football, have sparked the interest of sociolinguists. For example, the *Innsbruck Football Research Group* was created in 2007 in order to gather and produce new data and knowledge regarding the nature of communication in those multilingual teams, as well as the strategies used by clubs and managers. These studies mainly tended to rely on interviews and observational methodologies to obtain access to players, coaches or even referees’ perceptions and experiences of this issue (Giera *et al.*, 2008). While this has captured the complexity of language and communication, it does not enable a quantitative examination and comparison of the effects of language diversity (and asymmetries) on group outcomes and performance.

4. The *lingua franca* is defined as “any use of English among speakers of different languages for whom English is the communicative medium of choice, and often the only option.” (Seidlhofer, 2013, p. 10).

Similarly, within the field of cultural sport psychology, where scholars have stressed the necessity to explore the relationship between cultural identities and group dynamics (Schinke *et al.*, 2014), designs are primarily qualitative in nature. Particularly, studies in that field have not yet begun considering cultural diversity and language diversity as actual team composition characteristics to examine in relation to group outcomes. Most of these works are concerned with giving voice to minorities and thus tend to focus on the singular experiences of expatriate players and their acculturation process (e.g., Schinke & McGannon, 2014). In contrast, within the organizational psychology and international business literature, football settings have often been utilized as relevant quantitative cases to examine the relationship between attributes of cultural diversity and numerous outcomes related to group functioning (e.g., Brandes *et al.*, 2009; Maderer *et al.*, 2014). Szymanski and colleagues recently proposed different perspectives on the language attribute regarding the analysis of football teams, through the lens of managers' and athletes' cultural characteristics (e.g., multilingual, bicultural competence) (e.g., Szymanski & Ipek, 2020; Szymanski *et al.*, 2021). While the use of mathematical indices (e.g., Blau's index) rather than categorical measurement (e.g., diverse vs. non diverse) is encouraged within this literature to capture diversity, Godfrey and colleagues (2020) stressed the need to match measurement with conceptualization.

### From language diversity to language disparity

Harrison and Klein (2007) defined diversity as the distribution of differences among the members of a unit with respect to a common attribute (e.g., nationality). From here, the attribute of interest should influence group and individual functioning depending on (1) contextual variables (e.g., task completed as a group), (2) processes involved (e.g., social categorization), and (3) the conceptualization, operationalization and measurement of the attribute.

In theory, every type of within-unit diversity can be conceptualized, measured, and operationalized as three “things” in their framework as defined by these authors (Harrison & Klein, 2007). Diversity can be indicative of variety, separation, or disparity. Variety refers to categorical differences among team members (e.g., experience, knowledge) with the number of represented categories contributing to team diversity (Bell *et al.*, 2011). Variety is a straightforward construct which spans from all members belonging to the same category (i.e., minimum

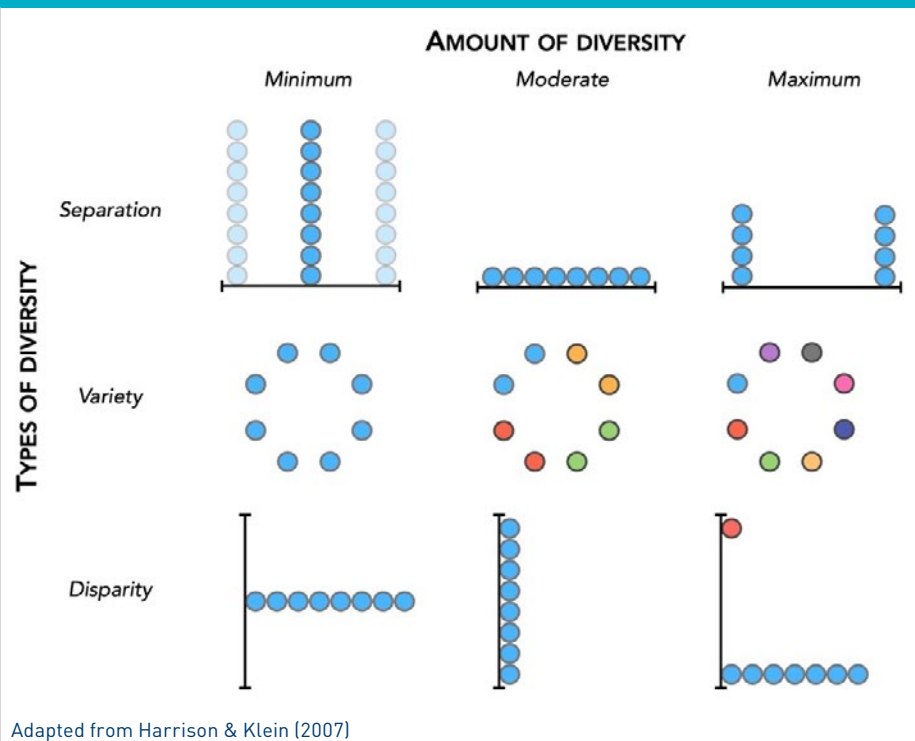
variety), to every single member belonging to distinct categories (i.e., maximum variety). Separation refers to differences in opinions or perspectives among team members across a continuum (e.g., value, beliefs). In other words, whether team members are high or low on the construct of interest is less important than the extent to which team members are similar or different does (Bell *et al.*, 2011). Finally, disparity represents differences in the concentration of valued assets or desirable resources on their vertical position on a continuum. Disparity captures the extent to which an inequality is present regarding the allocation of a resource of interest between all team members (Bell *et al.*, 2011). Figure 1 presents a graphic illustration of these three types of diversity adapted from Harrison and Klein (2007).

As an example, Church-Morel and Bartel-Radic (2016) provide a detailed three-dimensional approach of language diversity using a case study of a multilingual team collaboration in the software industry. They extend the definition of language diversity in terms of number of languages spoken or national language proficiency: “*Language diversity is a particularly complex type of diversity in that it is profoundly anchored in both what people do (skill and performance issues) and who they are (identity)*” (p. 13). The authors argue that the different issues related to languages in international business could be conceptualized through the Harrison and Klein (2007) typology with (1) language use and skill configuration as language variety, (2) language, identity, attitudes, and values as language separation, and (3) language, power, and status as language disparity. Because consequences of these conceptualizations can differ markedly, there is a need for researchers to carefully consider the type of diversity they intend to investigate.

In the literature, language is largely considered as a resource to own, resulting in within unit language asymmetries (i.e., inequalities). This resource-based view of language relies on the general idea that language skills can be empowering or disempowering resources (Vaara *et al.*, 2005) leading individuals with few or no skills to face stumbling blocks like career disadvantage, limited social interactions or exclusion (Gaibrois, 2018). Consequently, we believe it is relevant, and even necessary, across contexts to conceptualize language differences as language disparity. As such, the eventual quantitative measurement might capture the language diversity more accurately, as it would consider the assumptions behind asymmetries rather than solely measure a certain level of language variety.

FIGURE 1

## Graphical representation of types and amount of within-unit diversity



## Theoretical framework

Although various measurement tools might be relevant to measure certain indicators of cultural diversity (Godfrey *et al.*, 2020), the calculations are limited to capture the specific concept of language disparity. We describe, step by step, our methodological approach to propose a new index to capture language disparity: starting from the coefficient of variation, to the *Gini index*, to the proposition of the *Matiti index*.

### Measuring disparity with the Gini index and the coefficient of variation

The *Gini index* (see Appendix 1) measures the disparity in access to a resource between individuals. The index is set between 0 and 1. The maximum disparity (*Gini index* = 1) indicates that the income is concentrated in the top of the distribution (i.e., that the resource is captured by a minority), while an index equal to 0 shows an equal distribution of resources. It is mainly used in economics, to measure inequalities in the distribution of income or land (Gastwirth, 1972). The *Gini index* can be applied when considering an exclusive property, but the language

is similar to a public good, non-exclusive and non-private. Here, language disparity is more defined as the fact that some individuals do not have access to the resource while the majority does, rather than the situation where it is captured by one or a few.

Harrison and Klein (2007) proposed the coefficient of variation (see Appendix 2), alongside the *Gini index*, to evaluate disparity. When it is applied to an organization, it measures the distance between those who concentrate the resources and the other members. The higher the value of the coefficient the greater the dispersion around the mean. Without units, it allows the comparison of distributions of values whose measurement scales are not comparable. Since the standard deviation is divided by the mean, this coefficient is highly sensitive to the sample size. The disparity is upwardly biased in small samples (e.g., sport teams).

### Capturing language disparity with the Matiti index

To overcome the limitations that we previously highlighted regarding the existing measurements of disparity, there is a need to build a new index. Our index (i.e., *Matiti index*) proposes to observe the dispersion of the language proficiency in the general context of an organization defined in the following propositions.

Assumption 1: Based on the literature of cultural sport psychology (e.g., Eluère *et al.*, 2022a; Schinke & McGannon, 2014) and the reality of the professional sports context, we argue that the language to be mastered is twofold. We will refer to it as the organization's language. Firstly, it can be the language of the majority of the organization's members because it promotes integration and sharing of information between its members. Secondly, it can be the language of the organization's managers, as they are the ones delivering the instructions, setting the goals, and holding the power of decision<sup>5</sup>. Let consider:

5. It is possible that there is not one but two or several languages spoken by its members, without any of them coming out as the one used by a relative or an absolute majority. Despite it, it is possible that the members and the managers chose one language as the organization's one. If one of few members master them all, there is a situation of disparity favorable to the latter. Indeed, if for example half of a unit only speaks English and the other half only speaks French, the one team member who actually masters both languages will be able to understand and interact with everyone and get access to more information compared to the majority of the unit. We are not capturing this situation in our index yet. In addition, we acknowledge that the assumption may change depending on whether the coach created his team or joined it afterwards. However, the management team of a professional sports club usually includes not only the coach, but also the athletic director, the financial director, and the president. Thus, the coach does not have a systematic authority in the recruitment process.

- $L_{i,maj} = \{0,1\}$  is the language used by the majority  $_{maj}$  in an organization  $i$ . It equals 1 if one language is mastered by the absolute or relative majority of the members of the organization, and it equals 0 otherwise.
- $L_{i,man} = \{0,1\}$  is the language used by the managers  $_{man}$ . It equals 1 if the language is different from  $L_{i,maj}$ , and it equals 0 otherwise.

Assumption 2: The language is considered to be a quantifiable and valuable resource within an organization. The resource defines the return of one's investment in the organization, such as getting access to information or being part of a team. An individual can be part of the organization without mastering the language, but then he or she does not fully benefit from it.

Assumption 3: We consider that language is a non-exclusive and non-private resource. The access to the language might be provided by the organization but is not guaranteed (e.g., language lessons). It is the individual's responsibility to learn it outside of the organization. Thus, the access to this resource—language proficiency—varies from one individual to another.

Proposition 1a: There is a language disparity if the organization's language, as the language used by a majority of its members, is not mastered by a minority of its members (referring to the first part of Assumption 1).

Here we are inspired by the *Palma ratio*. The *Palma ratio* is an indicator of inequality which proposes to make the ratio between the 40% who have the least and the 10% who have the most<sup>6</sup> (Cobham & Sumner, 2013; Palma, 2011). The indicator was designed to be more sensitive than the *Gini coefficient*, which places the most weight on the middle of the distribution and not enough on the top and bottom. However, in the case of language practice, those who are most disadvantaged are the minorities who do not speak the language of the majority. We therefore propose to use the inverse *Palma ratio* (i.e., a ratio between those who speak the language of the majority best and those who speak it least well. Choosing the first decile is a standard ratio that makes sense in order to capture those who have the least in terms of resources. However, it would have been arbitrary to apply the 40%, knowing that this ratio is derived from the analysis of economic wealth inequalities. Descriptive statistics from our women's football teams' sample show that on average, Division 1 teams have 38% expatriate players and 62% national players. From there, we use the score of the 60% who speak the

majority language best on a team compared to the 10% who speak the majority language least well. We refer to the statistics of Division 1 teams because they have more financial resources to welcome foreign players and therefore have a higher probability of having multiple languages spoken (i.e., on the other hand our sample shows 9% of expatriate players per team in Division 2)<sup>7</sup>. Thus, we define the disparity in the use of the language of the majority as:

$$D_{i,maj} = \frac{\text{Language Proficiency}_{top\ 60}}{\text{Language Proficiency}_{bottom\ 10}} \times L_{i,maj}$$

Proposition 1b: There is a language disparity if the proficiency of the organization's language, as the language used by its manager, is unequally distributed among the members (referring to the second part of Assumption 1).

Here it is important to capture the inequalities between those who have the best mastery of the language and those who have the weakest. We use a relative interdecile range to measure this inequal distribution.

$$D_{i,man} = \frac{\text{Language Proficiency}_{top\ 10}}{\text{Language Proficiency}_{bottom\ 10}} \times L_{i,man}$$

Proposition 2: In the case of our indicator, we are interested in measuring language disparity, which reflects the inequal proficiency of the language in an organization, using the two disparity measures  $D_{i,maj}$  and  $D_{i,man}$ . The *Matiti index* gives the average of the two disparity indexes

$$\text{Matiti Index}_i = \frac{(D'_{i,maj} + D'_{i,man})}{(L_{i,maj} + L_{i,man})}$$

Where  $D'_{i,maj}$  and  $D'_{i,man}$  are normalized:

$$\begin{aligned} \bullet D'_{i,maj} &= \frac{D_{i,maj} + D_{maj\_min}}{D_{maj\_max} + D_{maj\_min}} \\ \bullet D'_{i,man} &= \frac{D_{i,man} + D_{man\_min}}{D_{man\_max} + D_{man\_min}} \end{aligned}$$

If *Matiti index* <sub>$i$</sub>  = 0, it shows no disparity. If *Matiti index* <sub>$i$</sub>  = 1, it represents a strong disparity.

6. The ratio can vary across contexts.

7. The sample on which the calculations were made is detailed later in this article.

Proposition 3: The *Matiti index*<sub>i</sub> can be interpreted in the light of other indicators of cultural diversity. The index of dispersion (see Appendix 3) indicates if one language is considered by each member of the organization as her/his own main language. A dispersion index  $\leq 0.5$  indicates that the same language is used as the main one by a relative or absolute majority of the organization. If the dispersion index is  $> 0.5$ , there is no language that comes out as shared as the main language by the majority of the organization.

Coming back to Harrison and Klein's typology (2007), national variety is one commonly used indicator of cultural diversity, calculated through the *Blau index* (Godfrey *et al.*, 2020). This calculation (see Appendix 4) is based on the objective number of represented nationalities (i.e., categories) in a team and the proportion in which these nationalities are represented in relation to the total number of group members. This index varies between 0 (i.e., minimum variety: all players have the same nationality) and 1 (i.e., maximum variety: all players have a different nationality). In other words, a score of within-team national variety not only gives a sense of the proportion of expatriates within a unit but generally adds insights regarding the diversity of national backgrounds. Then, two teams with 20 members each will not have the same score of national variety if one has seven expatriate players coming from the same country (i.e., two categories in total), and the other has seven expatriate players coming from all over the world (i.e., eight categories in total). From there, one could also argue that consequences on the individual and group functioning might differ markedly within these two hypothetical teams, starting with language disparity.

Therefore, the *Matiti index* can be relevant to interpret in the light of other indicators of cultural diversity like the ones listed. Especially in placing language asymmetries in perspective with team national variety as a way to obtain better context and insight regarding the value of language within specific units and to identify which teams are the most at risk to face inequalities based on language resources.

## Empirical results

### Context

The French elite women's football is a particularly relevant/strong case for exploring the outcomes associated with various multicultural/multinational contexts. Thus, all women's first and second league clubs in France were contacted with the direct support of the FFF. In total, our sample comprised 21

high-level women's football teams from top French championships (i.e., 7 teams from the Arkema D1; 14 teams from the women's D2)<sup>8</sup>. This sample was considered to be representative of (1) the high level of sport and (2) the heterogeneity of the teams in terms of cultural diversity in one of the major European women's football championships. As women's football is currently growing in Europe, along with the decrease in financial gaps with men's football, its characteristics make it possible to represent a large spectrum of teams and to compare extremes in terms of language diversity (e.g., D1 team widely recruiting internationally vs. D2 team only recruiting locally). In fact, among the 21 participating teams, there were a total of 403 host country nationals and 98 expatriate players, the latter representing 38.4% of D1 players and only 9.2% of D2 players. More precisely, in the D1 championship, the vast majority of expatriates come from the Netherlands, Anglo-Saxon countries and Nordic countries. In the D2 championship, expatriates first arrive from the African continent, then from Anglo-Saxon countries. Concurrently, over the course of the season, expatriate players playing in D2 reported higher proficiency in French (average self-reported proficiency: 8.06 on a scale of 1 to 10; Min = 2.50; Max = 10) than expatriate players playing in D1 (average self-reported proficiency: 5.59 on a scale of 1 to 10; Min = 1; Max = 10). Ultimately, this sample makes it possible to compare a variety of language disparity situations (e.g., relatively homogenous teams with only one or two expatriates not being able to speak French while this is the organization's language; highly multicultural teams with the majority of players being able to interact both in French and in English).

To measure each team's level of language disparity, data were collected three times across the 2020–2021 football season from 501 players in total ( $M_{age} = 22.54$  ans,  $\pm 4.46$ , Min = 15, Max = 38), as part of a longitudinal project conducted with the support of UEFA and FFF (Eluère *et al.*, 2021). Several variables were collected. The first is a self-reported measure of players' French and English language proficiency (i.e., competence in French from 1 to 10; competence in English from 1 to 10). The objective language disparity measured by the *Matiti index* is calculated using the latter. The second variable is the first language listed by participants when asked about the languages they speak. We considered it as the main individual language spoken. The language

8. Division 1 is the first women football league in France (D1); Division 2 is the second women football league in France

distribution measured by the index of dispersion is calculated on the latter. The third variable, provided by both athletes and coaches, is the proportion of French and English' use (% of time) to communicate and interact within the group (i.e., between players; between staff members and players). The last variable is the number of languages spoken by the respondent. These last two variables were only used to give context to the *Matiti index* scores and further discuss the teams' respective levels of language disparity.

### Main outcomes

The linguistic resource can be of two kinds: (1) a local resource, the national language of the country (here, French) or (2) an 'imported' resource, an alternative language selected by the organizations' members because it is shared by a greater number (i.e., the *Lingua Franca*, here, English). If there are strong

disparities regarding the national language mastery, the imported language plays the role of a 'redistributive' adjustment to reduce disparities.

Table 1 shows that all teams have chosen to communicate in French rather than English. In nearly all the teams, French is used the majority of the time. These estimations are based on subjectively reported measures. Players and coaches were asked to report the proportion of use of French and English within the team or by coaches when interacting with their players, respectively. Yet, French is not the first language used by all players. For instance, 41% of players in Team3\_D1 consider French as their first language and yet French is said to be used between 55.5 and 55.4% of the time. Inversely, some teams are completely homogenous (e.g., Team9\_D2). French is the first language for all players in those teams and is almost always used in interpersonal exchanges.

**TABLE 1**  
**General language diversity profiles of participating D1 and D2 football teams**

Teams	French as first language (Players) Mean % (SD)	Proportion French/English (Players) %	Proportion French/English (Staff) %	Proportion polyglotes Mean % (SD)	Full sample
<b>Division 1</b>					
Team1_D1	66.7 (0.482)	86.3	75	58.3 (0.504)	24
Team2_D1	87.5 (0.338)	91.5	91	62.5 (0.495)	24
Team3_D1	57.1 (0.504)	76.9	88	67.9 (0.476)	28
Team4_D1	40.9 (0.503)	65	63	72.7 (0.456)	22
Team5_D1	45.5 (0.510)	71.6	81	90.9 (0.294)	22
Team6_D1	55.2 (0.506)	62	74	82.8 (0.384)	29
Team7_D1	69.6 (0.470)	75.4	89	69.6 (0.470)	23
Team8_D1	55 (0.510)	67.5	62.5	75 (0.444)	20

**TABLE 1**  
**General language diversity profiles of participating D1 and D2 football teams**

Teams	French as first language (Players) Mean % (SD)	Proportion French/English (Players) %	Proportion French/English (Staff) %	Proportion polyglotes Mean % (SD)	Full sample
<b>Division 2</b>					
Team1_D2	84 (0.374)	86.7	90	68 (0.476)	25
Team2_D2	75 (0.441)	71	.	50 (0.509)	28
Team3_D2	89.5 (0.315)	96	100	63.2 (0.496)	19
Team4_D2	57.1 (0.507)	96.3	90	52.3 (0.512)	21
Team5_D2	70 (0.470)	100	100	75 (0.444)	20
Team6_D2	83.3 (0.381)	95.7	100	71 (0.463)	24
Team7_D2	76 (0.436)	98.3	100	52 (0.510)	25
Team8_D2	85.7 (0.359)	86.7	90	66.7 (0.483)	21
Team9_D2	95.8 (0.204)	93	100	58.3 (0.504)	24
Team10_D2	100 0	97	100	75 (0.442)	24
Team11_D2	85.2 (0.362)	97.6	.	48.1 (0.510)	27
Team12_D2	61.9 (0.498)	95	100	66.7 (0.483)	21
Team13_D2	83.3 (0.381)	79.6	70	79.2 (0.415)	24
Team14_D2	95.7 (0.209)	98.5	100	65.2 (0.487)	23
Team15_D2	53.3 (0.507)	91.7	.	43.3 (0.504)	30
Team16_D2	88.9 (0.320)	85	93	63 (0.492)	27

### A preliminary examination using the Gini index

We initially estimated the language disparity with two *Gini indexes*: the *Total Gini* (i.e., based on the sum of competencies in English and French) and the *French Gini* (i.e., based on the competence in French only) to consider each actual team's language context/environment<sup>9</sup>. We also propose the subtraction of the two indices (i.e., *French Gini Coefficient* minus *Total Gini Coefficient*) as a preliminary indicator of language disparity trend. When the indexes' difference is close to zero, there is little risk of disparity. If the value is positive, there might be more language disparity in the use of French than English in this specific group. If the value is negative, there might be more disparity in the use of English than French.

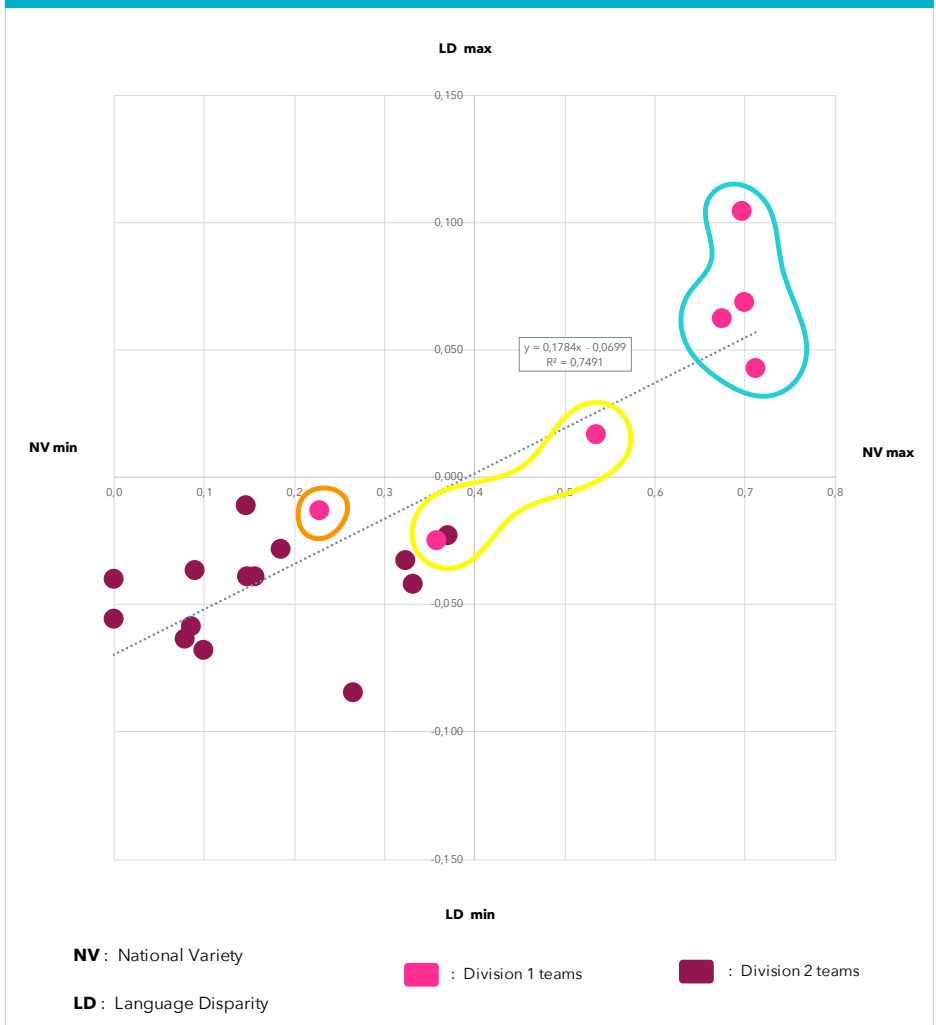
In sport teams, languages that are only spoken by a few individuals are typically not used within the organization. French is not used if only one person understands it. Similarly, there is no point in 'importing' English if everyone in the team speaks French or if only one person understands English. Accordingly, Figure 2 shows a correlation between language disparity tendency and national variety within Division 1 and Division 2 football teams across the season ( $R^2 = 0.75$ ). In Figure 2, the data presented are the teams' average scores of national variety and language disparity calculated through the *Gini index* over the three measurement times. The specific figures for each time (i.e., beginning, middle and end of the season) are included in Appendix 5.

As shown in Figure 2, the current available index for the measurement of disparity (i.e., *Gini index*) tends to identify the most multinational teams (i.e., circled in turquoise) as being most exposed to language asymmetries when using French. On the contrary, other Division 1 teams with more moderate scores of national variety (e.g., the two teams circled in yellow and the one team circled in orange) appear to be less at risk when looking at language disparity through the *Gini index*. However, the *Gini index* does not capture disparity in teams where a minority does not master the language used by the majority. Yet, we believe the language asymmetries might be even more impactful when only a minority of team members do not master the language of the majority.

9. For example, for some teams, the mastery of English might be completely irrelevant because the team is 100% French players.

FIGURE 2

Trend of team language disparity (calculated through the Gini coefficient) put in perspective with national variety context of D1 and D2 football teams on average across the season



### The Matiti index as a relevant empirical perspective

In contrast to the *Gini index*, the *Matiti index* identifies teams where language disparity affects a minority of its members. Thus, the *Matiti index* should be higher in teams where a minority of the players poorly mastered the language used by the majority of the team members. In other words, a high score on the *Matiti index* suggests that a minority of players might not have access to the organization/team language as a valuable/crucial resource for social integration, understanding the coach's instructions, etc. Table 2 shows the respective scores of language disparity (i.e., through the *Matiti index*) of the seven D1 teams in our sample across the season. The specific figures for each time (i.e., beginning, middle and end of the season) are included in Appendix 6. They illustrate how the scores of *Matiti index* varied over time, especially for some teams whose rosters have fluctuated across the season (e.g., departures and recruitments of players) and/or whose attrition rate has varied between each time point.

Teams	Matiti index T1	Matiti index T2	Matiti index T3	Average Matiti index
Team7_D1	0.48	0.74	0.61	0.61
Team1_D1	1.00	0.37	0.38	0.58
Team5_D1	0.53	0.42	0.38	0.44
Team6_D1	0.40	0.44	0.28	0.37
Team3_D1	0.40	0.27	0.44	0.37
Team4_D1	0.24	0.43	0.32	0.33
Team2_D1	0.37	0.43	0.57	0.46

Note : l'index est normalisé sur l'équipe ayant eu le score le plus élevé au T1 (i.e., Team\_D1).

We previously defined the by referring to the language mainly used in the team, according to players. In the case of our sample, is similar to for all football teams. With the exception of one team at the end of the season (after a new coach was recruited), the coaches and staff members use the same language as the majority (i.e., French). Thus always equals 0 (except for Team4\_D1 at the end of the season). Accordingly, the *Matiti index* has generally only been calculated based on the language used by the majority (i.e., French).

The Team1\_D1 is a typical case of a team with extreme language asymmetries. At T1 (beginning of the season), the 10% of team members who master French the least in this team reported the lowest scores possible regarding language proficiency (i.e., 1/10), at the same time, the 60% of players who master French the most speak and understand it perfectly (i.e., 10/10). Over time, the players with the lowest language proficiency improved their level of French which explains why the scores of *Matiti index* decrease throughout the season. In general, the *Matiti index* tend to vary over time in a non-linear way. It is sensitive to the variation in the numbers of players speaking the language of the majority or not, as well as the language used by the coach<sup>10</sup>. The Team4\_D1' has a *Matiti index* that increases significantly between T1 and T2, reflecting an intensification of language inequalities. At the beginning of the season, the 10% of players who master French the least still report a fairly high level of French proficiency (i.e., 5.5/10) while French was the language of the majority and of the coach. At T2 (i.e., middle of the season) the club recruited more expatriate players and the average French proficiency reported dropped to 2/10. At T3, a new coach was recruited and imposed English as the language of the organization (e.g., language to use in practice and locker room), which reduced the level of language disparities (i.e., the score of *Matiti index* dropped by 0.11 points).

Generally, the *Matiti index* is highly dispersed among the teams. Of the 21 teams in our sample (i.e., 7 D1 teams and 14 D2 teams), four groups are identified. The first group includes more than half of the participating teams for which the *Matiti index* is < 0.25 (most of them are D2 teams). It shows little language disparity, minimizing the risks for individual and collective functioning to be threatened by this specific aspect of team composition. Teams in the second group present stronger language disparities, with an Index = [0.25-0.44]. We found that the

10. These aspects evolve according to recruitments and departures of players, but also regarding the attrition rate during each data collection.

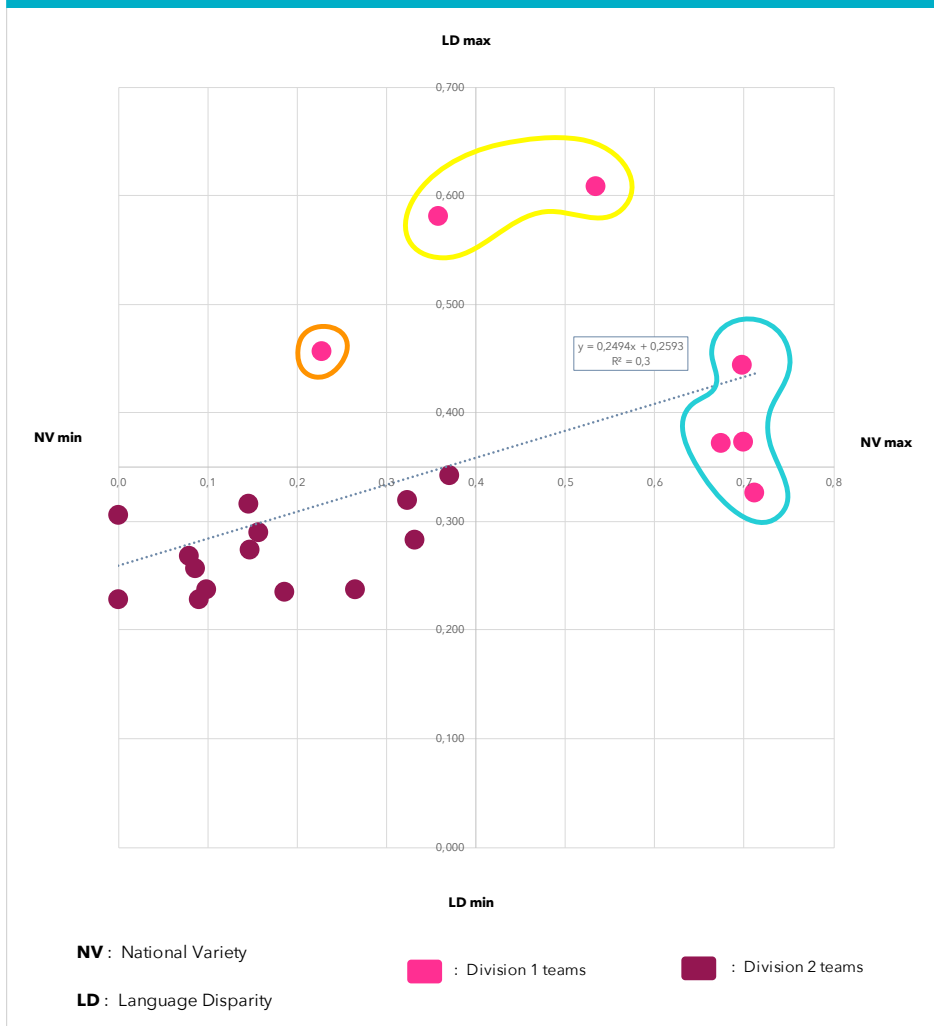
major risk for those teams might come from individuals' perceptions of languages asymmetries and consequent privileges, rather than from the objectively acceptable level of language disparity. The third group refers to teams where language may start to represent a source of inequalities with the *Matiti index* ranking between 0.45 and 0.55. Above the latter, 0.55, teams with higher *Matiti index* face strong language disparity. In these situations, a minority is unable to master the language used by the majority and it might lead to some forms of exclusion, as well as threatening the teamwork efficiency and players' willingness to invest time and effort in their team and teammates.

To help interpret and discuss the *Matiti index* calculations, we compared it to the computed index of dispersion, as well as the national variety. On examining the dispersion index, we found that there is no compelling evidence that language diversity leads to language disparity. The index of dispersion reveals a strong heterogeneity among teams, from some Division 2 teams where everyone speaks French (i.e., index of dispersion equals 0) to one Division 1 team where the first languages are almost as numerous as the number of players (i.e., index of dispersion equals 0.87). This language heterogeneity is not found to be specifically correlated with language disparity. Accordingly, Figure 3 does not show a straightforward correlation either between language disparity (i.e., scores of *Matiti index*) and national variety within Division 1 and Division 2 football teams on average across the season ( $R^2 = 0,3$ ).

In contrast to Figure 2 (i.e., language disparity calculated through Gini index), Figure 3 does not show a clear correlation between language disparity (i.e., score of *Matiti index*) and national variety within Division 1 and Division 2 football teams. The most nationally diverse Division 2 roster also has the highest language disparity score (.34) among the teams in this league. However, the distribution of Division 1 teams highlights the fact that the most multinational teams are not necessarily those with the highest risk of language proficiency inequalities. For example, the least diverse Division 1 team (i.e., circled in orange), in which only three foreign players play, has a higher language disparity score than teams that include between nine and 14 international recruits (i.e., teams circled in turquoise). On the other hand, the highest language disparity scores are held by two teams (i.e., circled in yellow) that are certainly multinational but do not hold the most extreme scores of national variety.

FIGURE 3

Team language disparity (calculated through the *Matiti index*) put in perspective with national variety context of D1 and D2 football teams on average across the season



## Discussion

In this methodological article, we propose the *Matiti index* as a measurement of language disparity in teams (e.g., professional sport teams, business teams) with an application to professional sport teams. We have illustrated the different stages of our reflection through data gathered from 21 top-level women's football teams in France representing various levels of national and language diversity. The results showed singular dynamics for each of these 21 teams, confirming that languages are not static elements and should not be reduced to proficiency in a national language. Analyzing it as a social practice, and especially as a resource of its own leading to inequalities (i.e., language disparity), raises a number of methodological issues, in particular with regard to the measurement and operationalization of such a construct. We continue to believe that it is crucial to develop the most accurate measurement tools possible in order to identify these language asymmetries and, ultimately, to analyze and prevent the effects of the consequent disparities within the group. This is the approach we have taken with the present *Matiti index* proposal. The following discussion will highlight (1) its main methodological contributions, (2) practical implications for both sport and organization contexts, (3) limits and perspectives for the measurement of within-team language disparity.

### Methodological Contributions

To our knowledge, this methodological study is the first to propose a tool specifically dedicated to the measurement of within-team language disparity. The *Matiti index* is designed as a unique contribution to the management and sport psychology literatures in that it can greatly contribute to unveiling the processes of power and privileges associated with language as a valuable resource to be possessed within multicultural groups and organizations. In contrast to the existing generic tools (e.g., Gini index, coefficient of variation), our findings show how the *Matiti index* captures asymmetries of language in a more sensitive and practical way as it was specifically grounded in the reality of professional sports organizations. We found that the most multinational/multilingual teams do not necessarily lead to the highest levels of language disparity. This may seem evident, but it is a crucial finding that demonstrates the relevance of the *Matiti index* to explore the consequences of language disparity more precisely.

Preliminary analysis (Eluère *et al.*, 2021) in which the *Matiti index* was empirically tested for the first time as an independent quantitative variable in relation to individual and group functioning, confirms how language disparity and its associated outcomes are less linear and more dynamic than existing tools (e.g., designed for land and salaries disparities) might have suggested. Moreover, it seems that the *Matiti index* succeeds (from a methodological standpoint) in capturing language disparity as a threatening group characteristic leading to exclusion processes, just as we have theorized/proposed.

As an illustration, exploratory data gathered from social network analysis<sup>11</sup> (SNA) highlighted how the teams with the highest average *Matiti* scores across the season seemed to be ultimately negatively impacted in terms of teams' inclusion and structures (e.g., Friendship, task and social leadership). For example, one expatriate player in Team7\_D1 was the only team member (including the other expatriates) with such a poor proficiency in French. Consequently, this player appeared to be socially excluded from the team. She did not consider any of her teammates as a friend and conversely. In addition, she only recognized staff members as task and social leaders, which prevented her from benefiting from the leadership of her teammates (e.g., motivational speech and advice given by the captain). Additional examples of how language disparity (calculated through the *Matiti index*) might impact the team structure are also reflected in the two other teams with the highest average *Matiti* scores (i.e., Team1\_D1 and Team5\_D1). Both teams had very high levels of language disparity at the beginning of the season, and although it tended to decrease, it seemed to have resulted in very fragmented groups at the end of the season, with the expatriate players on one side and local players on the other. As an illustration, the sociograms presented in Figure 4 (exported from Gephi®<sup>12</sup>) show the evolution of the group structure of Team5\_D1 with respect to the social leadership relationships between its team members from the beginning (T1) to the end (T3) of the season.

Naturally, these sociograms are used here to enrich the discussion of our methodological tool, but they do not constitute tangible evidence of a causal

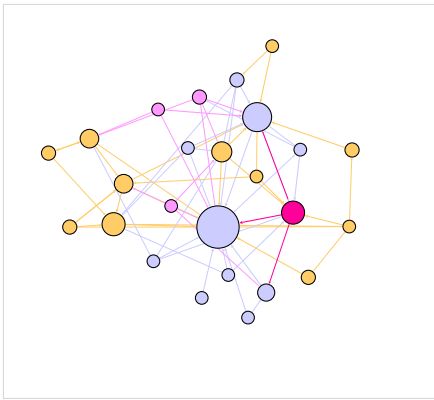
11. Social Network Analysis (SNA) is an innovative method based on group members' nomination that extracts in an extremely precise way the characteristics of a group (e.g., density, reciprocity of relationships) and identifies the influence of perceptions and norms on the dynamics of its structure (Kim & Yim, 2017).

12. Gephi is an open-source software for exploring and manipulating networks (Bastian *et al.*, 2009).

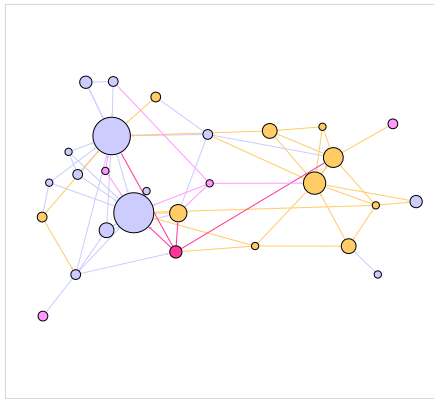
FIGURE 4

## Sociograms of social leadership relationships within Team5\_D1

Beginning of the season (T1)



End of the season (T3)



The nodes represent players/ team members and the colours correspond to their status (i.e., purple: local/French players; yellow: expatriate players; fuchsia pink: head coach; light pink: staff members). The arrows represent the relationships between team members with respect to social leadership (i.e., one arrow directed toward one player equals one nomination as a social leader). The more a player is perceived as a social leader (i.e., a leadership role off the field to promote goodwill and a good atmosphere), the larger and more central the node.

relationship between language disparity and social exclusion within groups. Future studies are needed to test and operationalize the *Matiti index* and the effects of the specific language asymmetries it measures more systematically and across contexts. Nevertheless, we believe that several practical implications are already worth discussing in light of our results.

### Practical Implications

In terms of practical implications related to the hands-on use of the *Matiti index*, we primarily believe that the way this new index captures language disparity is an interesting result itself in terms of awareness. It highlights the need for managers, both in professional sports and international business, to pay attention to those potential inequalities because they might lead to harmful effects on group and individual functioning and not necessarily on the teams one would

superficially think of (i.e., the most multinational rosters). In fact, this is one of the conclusions that was drawn from the UEFA longitudinal study that was conducted over the 2020–2021 season with 21 high-level women football teams in France (Eluère *et al.*, 2021). The findings confirmed that one challenge for clubs and coaches was to limit and control the risks of language disparity [calculated through the *Matiti index*] within their teams as the latter was found to threaten collective/individual functioning and performance along the season. However, the mastery of language is not a resource that can simply be redistributed equally among group members. This implies that teams engage in ways to (1) decrease such disparities (e.g., language courses, implementation of a common language and communication strategies), or at least (2) ensure frequent transparent and honest dialogue to discuss these inequalities early enough to make them less prevalent, visible, or even debilitating (e.g., communication on the field, cooperation, access to the benefits of leaders).

Furthermore, the concrete value of such a tool for managers is the opportunity to monitor the level of language disparity over time. This way, it would be possible for them to track its evolution, have better visibility on how it affects their group or not, and ultimately receive feedback on the impact of actions taken to limit it (e.g., language classes, cultural awareness training). In international business, an extensive body of literature has shown how language diversity has a strong impact on management decisions in multinational corporations, highlighting how crucial it is to be able to capture its complex effects accurately (Tenzer *et al.*, 2017). Yet choices made by managers (e.g., recruiting locally or internationally, imposing a common language) will automatically have consequences in terms of group efficacy, performance, equality, or individual sense of belonging for example (e.g., Chanlat *et al.*, 2013; Horn *et al.*, 2020). The Team4\_D1 in our sample illustrated this perfectly as impactful choices in terms of recruitment (e.g., more expatriate players at T2; new bilingual coach at T3) and management of cultural diversity were operated over the course of the season (e.g., the new coach-imposed English as the language of the organization). Consistent with how we wanted our index of language disparity to be pragmatic, accurate and sensitive, those choices made within the Team4\_D1 seem to have significantly impacted its score of *Matiti*, as well as its associated risks (e.g., management decisions between T2 and T3 appear to have positively regulated the level of language disparity).

More research is needed to assist managers of multinational/multilingual teams using tools such as the *Matiti index* to monitor language disparity and eventually rely on them to make these types of decisions across fields.

### Limits & Perspectives

Below are listed the main limits and perspectives of this study that future research might wish to consider when aiming at capturing the level of within-unit language disparity in the most accurate, sensitive, relevant, and practical way possible. Generally, the issue of language disparities within sport teams or organizations requires more research both in terms of how to capture it and on its consequences for group and individual functioning. The present project is quantitative by nature as it was built to answer a concrete need that we had for the data collection of our UEFA large-scale quantitative longitudinal study (i.e., testing the effect of language disparity as an independent variable on several aspects of group and individual functioning: Eluère *et al.*, 2021). However, we believe it would be interesting in the future to conduct field research based on interviews and observations to complete the analysis of our initial data. This way, we could further examine outcomes associated with language disparity (e.g., feeling of inclusion/exclusion, structure of the group, experience of team members) as measured through our proposed tool (i.e., *Matiti index*) and check its sensitivity/accuracy through individuals' singular experiences, perceptions, and interpretation of the reality. Such studies may even provide methodological insights to further refine and improve the quantitative measure offered by the *Matiti index* so that it increasingly reflects the complexity of language disparity within teams and across contexts. To name a few perspectives, observations and interviews might reveal that body language (Furley & Schweizer, 2020) is a full participant in the level of language disparity on sport teams and should be incorporated into its measurement, just as team members' values and attitudes toward language use (Church-Morel & Bartel-Radic, 2016) might also play a role in the level of risk associated with language asymmetries.

In the same way, with regards to perspective about the quantitative measurement of language disparity through the *Matiti index*, we would later like to distinguish the mastery of French and English languages. We will calculate a second *Matiti index*, based on players' English skills. Then, depending on the language identified as the majority's language we could decide to either look at

one calculation or the other as a relevant indicator of language disparity depending on each specific team context. There is also a need to complete the database, as the index is strongly influenced by the sample size of the team and the level of attrition. If players who are not proficient in the language have a higher probability of not responding to the survey, then the index may be underestimated. Conversely, if the players with the best language skills are not included, then the index may be overestimated. For this reason, the three teams where the attrition rate was too high (over 50%) were excluded from the sample<sup>13</sup>.

Furthermore, we acknowledge that language competence as a self-rated measurement can be biased and thus presents limitations. Some players may under or overestimate their skills in French and/or English (e.g., in relation to low/high self-esteem; social desirability). Future research could bring participants to complete a language test to assess their language proficiency more rigorously in order to implement the *Matiti index* as objectively as possible (e.g., *Linguaskill*® for the certification of an English adapted to the workplace). However, unlike employees working in multinational firms who would have been partly recruited for their language skills, elite athletes playing in culturally diverse teams are not necessarily language professionals. Yet their jobs require them to interact with their international teammates on a daily basis in order to fit in and cooperate, but also to understand highly technical and sport-specific language to be able to apply instructions (e.g., tactics). To our knowledge there is no existing test to measure such specific language skills. More importantly, these skills are tightly linked to practice and are close to action capabilities. Therefore, we believe it was/is relevant to focus on athletes' perceptions of their own language skills as an indirect reflection of their power position regarding language as a resource within their team. In fact, when looking at individual responses, we noticed that in Team7\_D1 (i.e., team with one of the highest scores of *Matiti* throughout the season), the one expatriate player who had poorly rated her mastery of French at the beginning of the season, reported an even lower score of French competency at the end of the season. The data we used to calculate the *Matiti index* in the present study (i.e., self-report of language competence) might then even be interesting in that it somehow take into account the actual experience of language disparity by players.

13. The sample was initially composed of 24 teams.

Eventually, it would be interesting to introduce an indicator of subjective/perceived language disparity. As part of the data collected in this larger longitudinal project (Eluère *et al.*, 2021), players also rated the extent to which they considered the non-mastery of the French or English language as a source of inequality within their team (i.e., how important/crucial do they perceive the mastery of French and English to be in their group). This variable was found to negatively moderate the relationship between the language disparity calculated through the *Matiti index* and several aspects of individual and collective functioning (Eluère *et al.*, 2021).

## Conclusion

In conclusion, we propose that the effects of language disparity can be tested more systematically and quantitatively using the *Matiti index*. Specifically, the generated language disparity scores should be taken as an independent variable to analyze its relationships with different aspects of group/individual functioning and performance. We believe that one promising avenue, both for the scientific literature and group managers, will also be to track and compare group dynamics and structures of teams representing a large spectrum of language disparity levels calculated with the *Matiti index*. Ultimately, the *Matiti index* could even be used as a practical tool for managers (e.g., via the development of an application) to assist them in their decision-making process regarding team building, inclusion of expatriate players or prevention of exclusion.

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#### APENDIX 1

##### Formula of the *Gini index*

$$Gini\ index = \frac{(\sum |D_i - D_j|)}{(2 \cdot N \cdot D_{mean})}$$

Where  $D$  stands for any resource own by a share of individuals  $i$  or  $j$  who are all members of the same organization.  $N$  stands for the total number of the members in the organization.

#### APENDIX 2

##### Formula of the *Coefficient of variation*

$$Coefficient\ of\ variation = \frac{(D_i - D_{mean})^2 / n}{D_{mean}}$$

Where  $(D_i - D_{mean})^2 / n$  stands for the standard deviation of a resource  $D$ .  $D_{mean}$  stands for the mean of this resource. It gives the variability of the resource  $D$  in a unit members' resource relative to the mean of unit members' resource  $D$ .

#### APENDIX 4

##### Formula of the *Index of dispersion*

$$Index\ of\ dispersion = \frac{k(N^2 - \sum f^2)}{N^2(k - 1)}$$

Where  $k$  stands for the number of categories of any resource,  $N$  is the number of individuals in the organization,  $f$  is the number of frequencies. If the Index equals 0, all frequencies fall in the same category. If it equals 1, the number of categories equals the number of individuals.

#### APENDIX 5

##### Formula of the *Blau index*

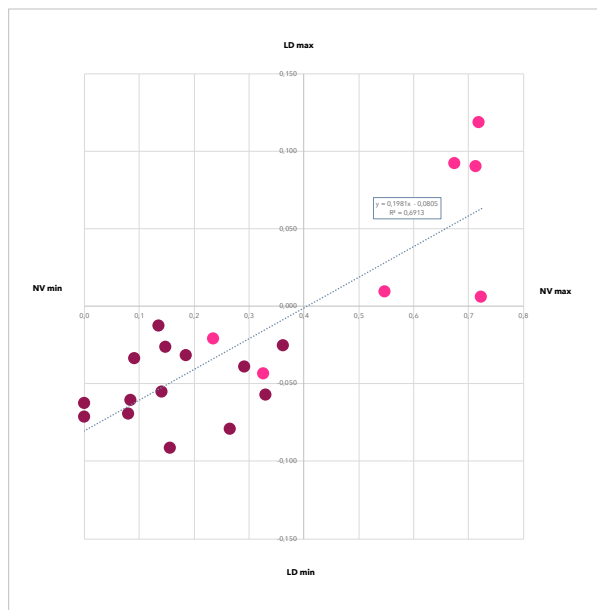
$$Blau\ index = 1 - \sum pk^2$$

Where  $p$  is the proportion of unit members in each represented category  $k$  of any resource. The total number of categories is  $K = 1, \dots, k$ . The value of the Index ranges from 0 to  $(K - 1) / K$ . The maximum occurs when all members are spread equally over all  $K$  categories.

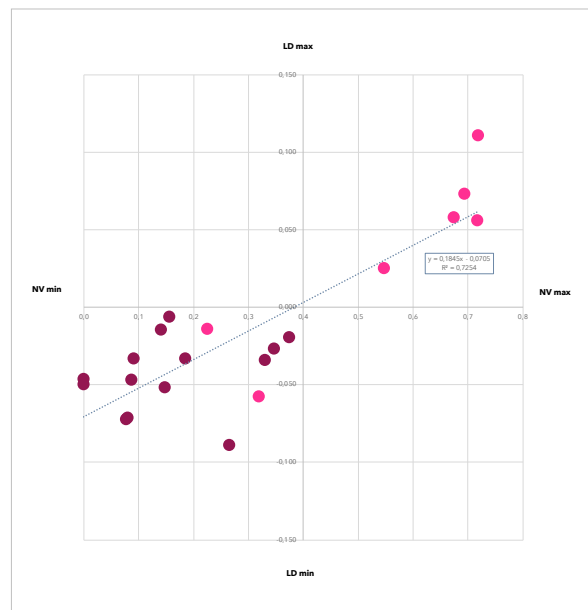
## APPENDIX 6

Team language disparity (calculated through Gini coefficient) put in perspective with national variety context of D1 and D2 football teams at three time points.

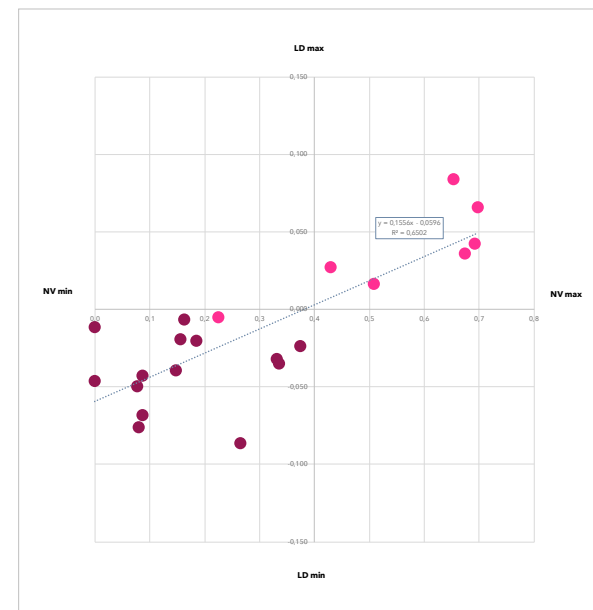
Beginning of the season (T1)



Middle of the season (T2)



End of the season (T3)



NV : National Variety

LD : Language Disparity

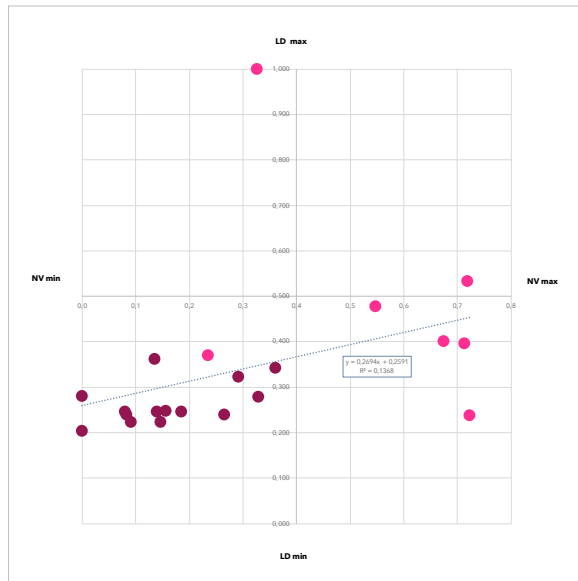
■ : Division 1 teams

■ : Division 2 teams

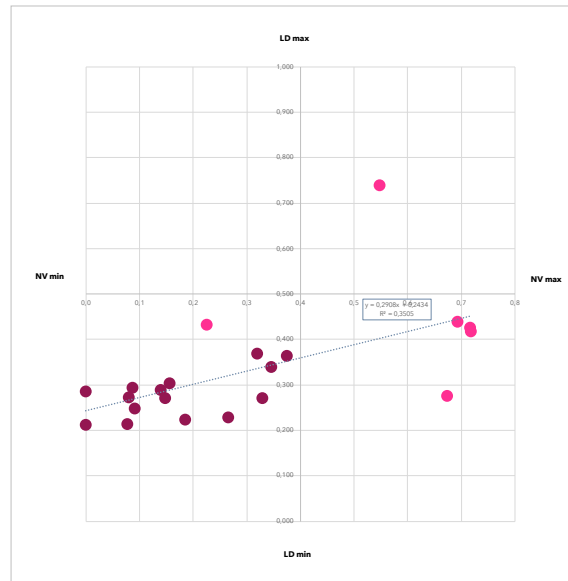
## APPENDIX 7

Team language disparity (calculated through Matiti index) put in perspective with national variety context of D1 and D2 football teams at three time points.

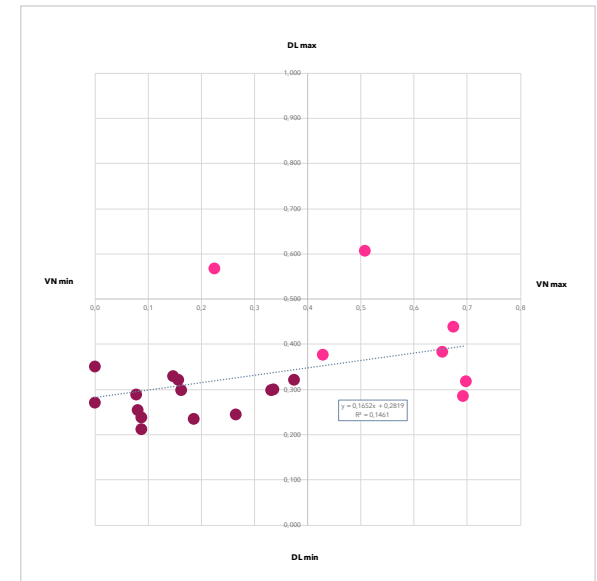
Beginning of the season (T1)



Middle of the season (T2)



End of the season (T3)



NV : National Variety    LD : Language Disparity    : Division 1 teams    : Division 2 teams