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"We are capable and we must not be silent!": the science-theatre interface as a catalyst for female empowerment

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Abstract   We aim to understand the audience's theatrical experience of *Cidadela* — a play produced by Museu da Vida Fiocruz — and if/how it encouraged the spectators to reflect on structural sexism, which is its core theme. After analysing 299 questionnaires, we found that the audience recognised the theme as both relevant and topical and they identified and related various scenes to their own lived experiences. The play encouraged the audience to reflect on different dimensions of female empowerment, particularly the psychological and political ones. It is, therefore, worth emphasising the potential of theatre in raising awareness, evoking empathy and inspiring young people to strive for freedom and autonomy, which seems to us fundamental for young women to get closer to science and increasingly identify themselves with it.

Introduction   *Inside us there is an immense force that has made this world spin forever. Inside each one of us. When we are together, we conquer, we win, we overcome. That's why they, men, want us silent, quiet, isolated. Because they know about our strength and don't want to share the space they gained by shutting us up.*
And this is the time when we need each other the most.
I call on all the women of Vem Quem Quer to join!

The above excerpt illustrates one of the remarkable scenes of the play *Cidadela*, in which the character Marina Lá Se Foi[1] calls for the strength of the union of the women of Vem Quem Quer[2] town, when posed with the problem of water

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[1]TN: Marina's surname (*Lá Se Foi*) means "gone".
[2]TN: The city's name (*Vem Quem Quer*) means "come whoever wishes to".

shortage. In Vem Quem Quer, women are literally forbidden to speak. In fact, they can talk, but only when men are not present. The characters Juçara Brio Forte[3] and Justa Plena de Si[4] seem to accept the imposed silence, passed from generation to generation. Yet, the young and inquisitive Nina Garota[5] is unhappy and will count on the support of Marina Lá Se Foi, whose thirst for knowledge forced her to leave the city. Directed by Letícia Guimarães,[6] *Cidadela* was produced by Museu da Vida Fiocruz. It targets young adults and presents structural sexism as its main theme. Staged by four black actresses, one of them being transgender, the play also brings the racial issue up for debate. *Cidadela* draws upon concepts from the social sciences, particularly addressing the configuration and perpetuation of the patriarchal system and racism, which directly impacts women entering science. The play strongly criticises these oppressive structures while also presenting solutions for confronting them. With a runtime of 50 minutes, *Cidadela* was showcased at the Museu da Vida in the northern region of Rio de Janeiro from August to November 2019. Throughout this period, it captivated an audience of 1,472 individuals. In March 2020, due to the Covid-19 pandemic, the Museu da Vida was closed to the public and the new season of the play was put on hold for two years. Finally, the show was staged again at the museum between May and November 2022.

In this research, through the analysis of 299 questionnaires filled out by the school audience who watched the show between September and November 2019, we sought to understand the theatrical experience of the *Cidadela* audience and if/how this experience encouraged any thoughts on structural sexism. To support this analysis, we used the concept of female empowerment, as this phrase was frequently mentioned in the responses of the spectators who had watched the show. Then, we discussed what type of female empowerment we are referring to and how theatre and science communication can be important means of boosting and framing this debate.

Within the context of this research, it is worth mentioning that this study was carried out by two white women from Rio de Janeiro who are both researchers: one works at the museum where the referred play was produced and is currently studying science and theatre; the other is a Postdoc researcher in feminism and science communication. Both authors are involved in feminism and equity issues in academia and science communication.

Female empowerment and its dimensions

By understanding that gender relations affect all layers of society and that they are one of the key cornerstones that shape our life experiences, it is important to highlight that their meanings and effects are not restricted to women only. Gender inequalities are related to social power relations and the relative positions of women and men in society, in an intersectional connection with race, class, sexuality and other social markers of difference [Crenshaw, 1989; Biroli & Miguel, 2015].

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[3]TN: Juçara's surname (*Brio Forte*) means "Strong Pride".
[4]TN: Justa's surname (*Plena de Si*) means "Full of Herself".
[5]TN: Nina's surname (*Garota*) means "girl".
[6]Please refer to the technical sheet of the play *Cidadela*: https://museudavida.fiocruz.br/index.php/noticias/1291-ficha-tecnica-de-cidadela.

According to Batliwala [1997], the concept of female empowerment started from the interaction between the feminist thought from the Global South together with popular education practices developed in Latin America in the 1970s. The Theory of Consciousness Raising, developed by Paulo Freire, is identified as one of the inspirations for the concept of empowerment. Freire believed it was not possible to provide any tools for subaltern groups to be empowered, but rather that those groups should empower themselves, through a combination of critical awareness of their reality and transformative action. In this way, external phenomena — such as a public policy aimed at female empowerment [Couto & Saiani, 2021], support and strengthening programmes or a theatre play on the subject — do not, by themselves, generate empowerment, but can act as catalysts for this process.

When discussing empowerment as redistribution of power, Batliwala [1997] points out that the goals of female empowerment would be to challenge patriarchal ideology, transform the structures and institutions that reinforce and perpetuate social and gender inequalities and empower impoverished women to have access to and control over material resources. In this way, empowerment is part of both a process of awareness and action to transform oppressive relationships.

It is important to consider that the term empowerment has been widely disseminated from different conflicting political approaches. Sardenberg [2018] organises its two main strands: (i) liberal empowerment — appropriate for discourses on development in a neoliberal approach — as a process in which individuals mobilise to gain access to resources in order to achieve results of their own interest; and (ii) empowerment for liberation, a perspective defended by Latin American feminists, which addresses empowerment as a collective action in which the acquisition of power occurs when groups challenge the *status-quo* and promote collective transformation. In this article, we are aligned with the second definition.

Whilst finding common ground between the definitions of female empowerment, Sardenberg [2006] highlights four main points: (i) to be empowered, dis-empowerment must have occurred; (ii) empowerment must be a self-reflective act of "empowering" oneself; (iii) empowerment as the construction of autonomy, the capacity to make decisions and to assume control over our lives; and (iv) empowerment as a process-based phenomenon and not as an absolute achievement at a certain point in time; and relational which is empowerment in relation to others or oneself.

Sardenberg [2018] also stresses that, when we talk about female empowerment, there is a shift in emphasis on the notion of power. Instead of thinking about "power over", which conveys a sense of domination and subordination, "power to" is emphasised, in order to express the dimension of power as a capacity for transformation, of a power that expands the horizons of what can be gained, without narrowing someone else's boundaries: "we need to see power as 'being able to or ability', specifically, the ability to change ourselves and the world around us. We need to think about a "transforming power" [Sardenberg, 2018, p. 20].

Empowerment is a multidimensional, non-linear, context-bound and heterogeneous process, occurring in different ways among groups of women, based on their experiences and cultural, historical and socioeconomic contexts [León, 2001]. In this research, we adopted the four dimensions organised by

Stromquist [1997] — cognitive, psychological, political and economic —, as they can be better applied to the interpretations and meanings processed by the public of *Cidadela*. The *cognitive dimension* refers to the critical view of reality, that is, the understanding that women acquire of the conditions of oppression and subordination in which they live, at their micro and macro levels. The *psychological dimension* refers to building self-confidence and self-esteem and recognising themselves as capable of improving their personal and social conditions. The *political dimension* refers to the awareness of power inequalities and the ability to organise and mobilise, starting from individual awareness to collective action. Finally, the *economic dimension* is related to the achievement of financial autonomy.

In addition to female empowerment, the play *Cidadela* focuses on the issue of silencing women, especially black women. Kilomba [2020], when speaking of the control and delegitimisation of black bodies, draws our attention to the existence of a silencing mask, in both a metaphorical and literal sense — as an object of torture used during the period of slavery. The mask, imposed by white masters on enslaved people, was a metal object inserted into the mouth of black people, between the tongue and the jaw and fixed to the head by two ropes. Aimed at preventing enslaved people from eating the products of the plantations, it also had the function of muting and frightening them. Kilomba speaks out against the silencing mask, regarding it as a symbol of the colonial system: "it symbolises sadistic policies of conquest and domination and their brutal regimes of silencing the so-called 'Others': Who can speak? What happens when we speak? And what can we talk about?" [Kilomba, 2020, p. 172]. Within the theme of the silencing of black people, Berth [2020] explores Audre Lorde's assertion that the burden of silence threatens to suffocate them. Berth argues that it is not merely an individual's personal silence, but rather "an institutional silence, a conduct, an action that provokes this silencing of subaltern groups" [Berth, 2020, p. 39].

Gender and racial equity, science communication and theatre

In science, institutional and structural racism persists as an ongoing issue. Alves-Brito [2020] speaks out against the phenomena of silencing and erasure experienced by black individuals in the fields of physics and astronomy. Their bodies, in fact, become invisible and occupy a position of "no place" within these scientific disciplines. When arguing about the need to make black people's scientific work visible to build knowledge, the author claims a place of legitimate presence: "These stories need to come out of the rubble of collective memory; they need to gain their space in museums, science centres, schools, universities, in the media, on the streets and in all the material and symbolic territories" [Alves-Brito, 2020, p. 834]. Unsurprisingly, in the play *Cidadela*, Marina Lá se Foi is characterised as a black woman who left the male-dominated city because she dared to challenge them, to crave knowledge and to share it with others. The character is described in the show as follows:

> [Corifeu] A long time ago, a girl from this land wanted more. She talked too much. She questioned too much. She wanted to know too much. [Choir] It takes courage. [Corifeu] She challenged the men. She could count from one to a hundred million. She knew how to add, subtract, multiply and much more: she knew how to divide (…) [Corifeu] Nothing worked, no one could hold

that girl. And she began to teach her knowledge to the others! [Souza-Ribeiro, 2019, p. 13]

Marina Lá se Foi, upon returning to Vem Quem Quer, guides the young Nina Garota in an attempt to solve the problem of lack of water supply in the city, while men are absent. Black women speaking up in the play is essential for achieving autonomy and independence in the search for knowledge and the resolution of problems. This is achieved by the use of both scientific evidence and traditional knowledge. This, as we will see, is reflected in the way the audience construed meaning and interacted with the show.

The themes of equity, inclusion and diversity have been increasingly valued and incorporated into the field of science communication in recent years. A systematic map of the literature by Judd and McKinnon [2021] found that academic work on this subject has been increasing since 2016, particularly in the American context. The theme was addressed in depth in special issues of journals specialised in science communication, such as published in the 'Journal of Science Communication', with editorials entitled "The need for feminist approaches to science communication" [Lewenstein, 2019] and "Neglected spaces in science communication" [Wilkinson, 2021] and the special issue about "Inclusive Science Communication" [Hayden, Hayden, Feliú-Mójer & Burks, 2020], published by 'Frontiers in Communication'. There is an increasing need to adopt an intersectional feminist approach to research in science communication. This approach can help to give visibility to the power relations that are embedded in the discourses around science, and to position and explain our views as researchers and science communicators [Haraway, 1995; Halpern, 2019; Reznik & Massarani, 2022].

From a practice perspective, the debate on equity, inclusion and diversity has become a central theme in several initiatives in the field, which in turn use different means and languages to promote these values. Within this context, we would like to emphasise the role of art, particularly the role of theatre, as a strategy for public engagement in science and in the themes mentioned in different viewpoints. Although the interactions between science and theatre are well established and intense, with plenty of examples from Ancient Greece to the present day [Almeida & Lopes, 2019], since the early 2000s there has been a renewed interest in the interface between these two fields [Weitkamp & Almeida, 2022]. This interest is shared by several areas including science communication and coincides with a paradigm shift in this field. It moves away from approaches based on the unidirectional transfer of knowledge — known as the deficit model [Brossard & Lewenstein, 2010] — to build more dialogue-based and inclusive communication models, focusing on democratic values, the recognition of historical inequities and the central role of voices from marginalised groups — as the model of inclusive science communication [Canfield et al., 2020].

Within the context of science communication, theatre has proved to be a very rich, diverse and experimental field. The survey carried out in 2020 by Weitkamp and Almeida [2022] points to a very diverse niche in terms of formats used and spaces occupied, suggesting a desire to reach a larger and more diverse audience, in line with the new demands that emerge in the area. Among the topics covered, there is a transition from more classic themes, such as biographies of famous scientists and

important scientific discoveries (usually associated with specific scientific disciplines and male and white researchers) to more delicate, complex and interdisciplinary topics, whereby the boundaries between science, politics, culture and society are blurred. This encourages reflection and debate on moral and ethical issues involving scientific and technological development, where discussions on equity, inclusion and diversity in science occur. The aforementioned survey also shows that there are several motivations for producing theatre in the context of science communication. These include encouraging reflection and debate on different aspects of science, including those already mentioned. Science is therefore framed in its historical and social context. In addition, public engagement in hot topics of science and technology and the empowerment of communities, who generally feel marginalised and excluded from science and its communication, are both promoted. In similar vein, other plays that are worth mentioning besides *Cidadela* include 'Walking Tall', about the common origins of life and the human species [Leenen & Blumenschine, 2022]; 'Remember Miss Meitner', about the Austrian physicist who discovered nuclear fission and had to interrupt her research to escape Nazi persecution in World War II [Friedman, 2002]; and 'Space Plague', a British immersive show aimed at an audience that has limited access to cultural activities and science communication [Keith & Griffiths, 2020].

Despite the recent boom in theatre productions in the context of science communication, academic research on these productions is still scarce, especially when considering those that address issues related to gender, race equity and social inclusion. Little is known about how they have contributed to science communication and whether they have, in fact, been able to promote the engagement of diverse audiences in the debate on these aspects of science, enabling empowerment and autonomy.

Theory and methodology

This study sits within the area of science communication, a practical and theoretical field that seeks to understand and strengthen the connections between science and society. From both a practical and theoretical perspective, there are several ways of conceiving the connections between science and society. Our approach is aligned with the movement of public engagement in science, which began to take shape particularly in Europe and the United States in the 1990s and has gained momentum in recent decades in various parts of the world [Gregory & Miller, 1998; Miller, 2001; Weingart, Joubert & Connoway, 2021]. This movement aims at creating spaces for dialogue marked less by the transfer of scientific knowledge from experts to the so-called lay public and more by the appropriation by the public of the science that interests them and/or that they are in need of [Brossard & Lewenstein, 2010]. From a theoretical point of view, public engagement in science politicises the view of science communication, emphasising the importance of citizen participation in the production of knowledge and in defining the directions of science and technology. From a practical point of view, this movement has driven the development of more dialogue-based science communication initiatives, which seek ways to involve the population in discussions on hot science topics in a more interactive way, marked by two-way exchanges between all those involved. An even more recent movement has intentionally and mutually valued and recognised the identities, voices and knowledge of historically marginalised groups in this dialogue between science and society. This intersectional approach, which

has been called the model of inclusive science communication [Canfield et al., 2020], is one with which we also align.

As in science communication, in contemporary theatre there is an increasing investment in the participation of the public and in the development of active citizens, ready to criticise the reality and willing to transform it [Desgranges, 2015]. In this study, we explored the concepts shared by the two fields, such as their mutual desire to reflect on and engage with the controversial issues of our time, particularly those related to citizenship, democracy, diversity, intersectionality and the fight against inequalities. Both have also directed efforts towards diversifying their audiences and reaching new ones.

From the field of theatre, we also used concepts and methodologies of theatrical reception. Desgranges [2019] states that there is no show without the presence of the spectator with whom the theatre dialogues about the world and about itself: "Without spectators interested in this debate, the theatre loses its connection with the reality that it had intended to represent" [p. 87]. Desgranges [2015] argues that understanding a scene does not consist of something previously established by the artist which will then be unravelled by the audience. According to him, producing meaning does not necessarily entail finding a definitive interpretation but rather examining how the artistic expression impacts us on an individual level. "It's less about figuring out what a scene means and more about asking what happens to us, how it hits us" [Desgranges, 2019, p. 93].

However, reading a scene, which involves language invention, attribution of meanings and previous experiences, requires training. In Desgranges' thought, it needs to go through a formative process. Starting from the concept of pedagogy of spectatorship, the author argues that the formation of the viewing and the acquisition of linguistic instruments will prepare the spectator for the dialogue that is established in the venue, in addition to providing them with tools to face everyday challenges. At this point Desgranges [2015] approaches once again the movement of public engagement in science by arguing that training spectators also consists in encouraging them to take their place not only in the theatre, but in the world, in educating them "so that they do not settle for a discourse that offers them a passive silence" [Desgranges, 2015, p. 37]. According to the author, the pedagogy of spectatorship is justified by the urgency to train spectators to watch mainstream shows with a critical eye.

This qualitative study aims at addressing the following key points: (i) what theatrical experience did the audience of *Cidadela* have at the Museu da Vida? and (ii) if and how did this experience encourage thoughts on structural sexism? To this aim, we collected data through questionnaires aimed at school audiences who attended the show during the data collection period. The fieldwork was carried out between September and November 2019, with 299 respondents from school audiences. The questionnaire consisted of 21 questions, of which four were open-ended questions and the others were closed. The questions addressed the relationship of the audience with theatre, the perceptions about the play and the sociodemographic profile of the respondents. This study focuses on the open questions regarding the audience's perceptions of the play and its main messages. When investigating the audience's thoughts on the play, we sought to map the repertoire of perceptions mobilized when watching the show. The question

regarding the play's message aimed to uncover the audience's interpretation when reflecting on its central theme. For the analysis, we used QDA miner 4.0 software when we first coded and categorised the answers based on the mentioned questions. We then refined the categories and deepened the analysis by organising the data and using references on empowerment dimensions, according to a feminist approach [Batliwala, 1997; Stromquist, 1997; Sardenberg, 2006; Berth, 2020] and on theatre and theatrical reception. The responses to the closed-ended questions in the questionnaire were compiled and analysed using Excel. We share here only the quantitative data considered relevant to fulfill the purpose of this article.

The theatrical experience was analysed in the answers to the questionnaires mainly through aspects related to the general appreciation of the play, the theatrical elements of prominence, the emotions provoked in the spectators, the relevance and timeliness attributed to the theme and the ways in which the public expressed their relationship with the theme of the play and its characters. The reflections on structural sexism were divided into four categories "Dimensions of Empowerment", according to the systematisation by Stromquist [1997] — cognitive, psychological, political and economic — which is described above. In Table 1, we list and describe the "Dimensions of Empowerment" category, with its subcategories and the codes used in the analysis of the open questions "Explain your answer, writing a little more about what you think of the play" and "In your opinion, what are the main messages of the play?"

Results and discussion

Spectators' profile

Among the respondent school audiences (299), most were women (168) and aged between 15 and 19 (174). Regarding their religion, the vast majority of the respondents declared to be Protestants (88), followed by 28 Catholics, eight from the Candomblé/Umbanda religion, six agnostics and five spiritists. In terms of education, most attended high school (120), followed by elementary school (81). As for the place of residence, the majority lived in Baixada Fluminense (107) and in the northern region of Rio de Janeiro (75). Regarding their race, 195 declared they were black and mixed-race, 68 were white, 12 Asian and eight indigenous.

For a large part of the audience, it was not the first time that they had watched a play (198). However, we noticed that attendance at the theatre among the consulted spectators was low. Of those who had gone to the theatre in the 12 months preceding the survey (98), the majority (77) saw one to three plays in that period. The data collected showed a prevalence of black and mixed-race backgrounds among the surveyed audience. This contrasts from previous research on theatre attendance habits in Brazil, where whites have been reported as the primary attendees. It is worth noting that Brazil has a population composed mostly of black people [Jleiva Cultura & Esporte, 2016]. The data can be explained, in part, by the context of theatre attendance, with many respondents experiencing the play as part of a school trip rather than during their leisure time. Additionally, the residential locations of the respondents, primarily in socially vulnerable areas inhabited mostly by black people, contribute to this pattern. The cast made of black actresses also likely played a significant role in attracting this audience to the show.

Table 1. Categories of "Dimensions of Empowerment" and codes used in the analysis of open questions "Explain your answer, writing a little more about what you think of the play" (P) and "In your opinion, what are the main messages of the play?" (M).

Category	Code	Definition
Psychological dimension Description: "power to"; building self-confidence and self-esteem and recognising themselves as capable of improving their conditions on a personal and social level.	Strength, power and ability (P and M)	Narratives about women's strength, ability and power. Mentions of the word "female empowerment", without other contextualisation, were included in this category.
	Autonomy and independence (P and M)	Narratives about women's independence and autonomy.
	Freedom (M)	Narratives about the strive for women's freedom.
Political dimension Description: ability to organise and mobilise, starting from individual consciousness to collective action.	Action and mobilisation (P and M)	Narratives about action and mobilisation, with verbs like "to fight", "to change", "to transform".
	Sisterhood (P and M)	Narratives that mention the union of women and the female collectivity.
	Voice (P and M)	Narratives that claim women's right to expression and suggest movement and action, such as not being silent when facing oppression.
	Youth (P)	Narratives that indicate the possibility of change through the action of youth.
Cognitive dimension Description: critical view of reality, "power over", an understanding of relations of domination and subordination; structural sexism and racism.	Misogyny (P and M)	Narratives about gender inequalities through male domination.
	Racism (P and M)	Mention of racism and oppression experienced by black women.
	Silencing (P and M)	Narratives about the silencing of women. While the category "voice" emphasises the ability to impose oneself in the face of silencing, this category emphasises the lack of voice.
Economic dimension Description: related to the achievement of financial autonomy.	Financial autonomy (P)	Mention of female financial autonomy.

Regarding gender identity, we observed that there was confusion in filling out the question "What is your sex/gender?", since we obtained answers that indicated the respondents' sexual orientation, such as "bisexual" and "homosexual".

Nonetheless, the above data reveals an audience with a profile, which, in many aspects, is similar to that of visitors of the Museu da Vida Fiocruz. These attendees are predominantly students from the suburban areas of the city and state of Rio de Janeiro, from families historically excluded from enjoying cultural activities, such as going to museums and theatres [Guimarães, 2019]. Yet, the same data is in contrast with the profile of those who most go to the theatre in Rio de Janeiro: white men and women, with higher education, belonging to classes A and B[7] and

[7]TN: In Brazil, classes A and B refer to social classes with high monthly income. In 2022, class A represented 2.8% of the population, exceeding a monthly household income of R$22,000; class B represented around 13.2%, having a monthly household income between R$7,100 and R$22,000.

resident in the southern region of the city [Jleiva Cultura & Esporte, 2016]. Considering the concept of spectator pedagogy [Desgranges, 2015], our study reinforces how relevant the work of Museu da Vida is in providing both theatrical and critical education to the audience. It also serves as an important vehicle for social and cultural inclusion, incorporating concepts and aspirations of the movement for public engagement in science and inclusive science communication.

Theatrical experience and appreciation of the play

We observed that the play was generally well received among the spectators consulted. Of the 299, 248 respondents thought that the piece was very good, 47 thought it was good and two thought it was bad (two did not respond). When justifying their positive appreciation of the play, the spectators listed several aspects related to the play itself and its theatrical experience. They particularly liked the plot (241), the actresses (184), the sense of humour (145) and theatrical elements (138), such as scenery, costumes, lighting, among others. Emotion (191) and joy (173) were the words that best expressed what they felt upon seeing the play.

The answers to the open-ended questions of the questionnaire helped us qualify and better understand the reception of the play. The fact that *Cidadela* is "thought-provoking" and "exciting", as well as bringing "humour" and "lightness", was highlighted in the answer to "Explain your answer by writing a little more about what you thought of the play". We noticed that the show had a strong cognitive and reflective imprint for the audience consulted, who, when expressing how they perceived the play, often resorted to terms such as learning, knowledge, reflection and teaching. In one of the responses, a 15-year-old black student argues that *Cidadela* "teaches a little not only to women, but also a lot to men", which highlights the feminist pedagogical element of the show when discussing the oppression and subordination of women in society and the role of men as allies in the fight for gender equity.

We also checked a recurring connection of the audience with the play through self-identification. This occurred mainly in two ways: (i) the audience saw themselves in several scenes and remembered moments of their daily life and (ii) the play was considered relevant and current because of the theme addressed, which suggests an association with its reality. In the first case, there were narratives such as "I saw myself in several situations" (woman, 15 years old, mixed-race), "in today's play several people could identify and understand that we, women, have a voice to feel free" (woman, 14 years old, white) and "I thought it was wonderful because I experience some things that happened in the play at home" (woman, 19 years old, black).

There were statements that revealed a strong sense of identification with the play based on individuals' personal experiences within their social environments. For instance, a teacher and mother of a black girl shared how the play resonated with the experiences of her students and her daughter — "I put myself in the situation of many students and friends; I thought about the future of women, especially black women (I'm a mother of a black girl). The play made me more willing to fight for all of us." (woman, 41 years old, white) — and a teacher who recalled the

experiences lived by his family members — "the play reminded me of the story of my mother and aunts: while men were responsible for 'food', women did their best for miles to fetch water" (man, 34 years old, black). Both statements show the dimension of the racial marker as an important element, demonstrating the relevance of an intersectional look that takes into account that gender inequalities do not occur in isolation from other social markers of difference, such as race and class.

We also found a strong identification of the spectators with some characters of the play, especially with Nina Garota, as the following statement illustrates: "I really loved the play and I really liked the character Nina; I identified myself with her a lot because she is always curious and inquisitive. She shows she is a sweet girl, full of joy to express and show to others" (woman, 23 years old, black). When we asked objectively — through a closed question — which character in the play they identified themselves with the most, the vast majority identified themselves with Nina Garota (167, of which 39 men, 110 women and 18 did not identify themselves), 70 people did not identify with any character and 43 identified themselves with Marina Lá se Foi.

We concluded, therefore, that both the fruitful experience in the theatre and the positive perception of the play, from people who did not necessarily chose to see it (school trip) and who do not have the habit of attending these cultural spaces, are strongly linked to their emotional and cognitive involvement with the show. As we saw in the responses analysed, the show was able to thrill, encourage reflection and connect with reality, as well as offering the audience entertainment and a learning opportunity. This result suggests that theatre in the context of science communication — as, in fact, for all theatre — should aim for the engagement of audiences with the theatrical game by carefully choosing themes the spectators can relate their lives with, as well as languages and theatrical resources able to offer them a rich experience of connection with these themes from a cognitive, sensory and aesthetic perspective.

Dimensions of empowerment mobilised by the public

Having experienced *Cidadela*, the audience provided a diverse range of perspectives on the play, touching upon critical themes related to women's subordination and oppression. They explored aspects like women finding their voice, embracing their power and demonstrating their capacity for autonomy and independence. Through their insights, the audience shed light on various layers of the female empowerment process depicted in the play. This ranged from an individual level to collective action and mobilisation and embraced concepts related to both awareness and action to transform the relations of oppression, as discussed by Batliwala [1997].

The dimensions of empowerment — according to the categories of Stromquist [1997] — most present in the responses were the psychological and political dimensions, followed by the cognitive dimension. The economic dimension was practically absent, mentioned in only one response. It is worth noting that the direct mention of female empowerment was more present in the answers to the question about the *message* of the play than about what the audience *thought* of the play.

According to the majority of the respondents, the main message of the play was related to the woman's ability to empower herself in a psychological dimension, that is, to feel strong, capable and autonomous. This perspective links with what Sardenberg [2018] defines as the "power to", i.e., a dimension of a transforming power, which expands the horizons and possibilities for oneself, understanding women's capacity to transform themselves and the world around them. In the statement of a 39-year-old black woman, the play conveys the message that "we must believe in ourselves and that we are capable even if the culture wants to label us as incapable", as well as in the perspective of a 17-year-old mixed-race young man, who stated that "in our society, everyone should have space, not only men. Everyone should have equal rights". A 16-year-old Asian girl, when reflecting on what she thought of the play, reinforced the importance of bolstering her own capacity and self-confidence: "I must believe in myself more and that women make a difference". Still in the psychological dimension, there are reflections about the achievement of autonomy and independence, as in the response of a 13-year-old white girl when she said that she thought "that we, women, should not be silent, we can be independent".

There were many perceptions about the play that led the spectators to reflect on the capacity of organization and engagement of women, starting from individual consciousness to collective action. Their statements highlighted the importance of unity among women, of having a voice and the strength of youth in creating change. These perceptions were categorised as part of the political dimension of female empowerment. In this perspective, a 19-year-old mixed-race girl stated that the play's message is to show "that women were not born just to be housewives; that a woman should not be silent; that a woman should follow her dream and not live someone else's dream; that a woman should free herself from the opinion of others and follow her own". In another response, a 16-year-old mixed-race girl reflected on what still needs to be achieved through feminism: "I thought it was very good, because feminism is a voice, an empowerment, it is courage and we must fight for our rights. A lot of things haven't been achieved yet".

In the cognitive dimension, we sorted statements that concern a critical view of reality, sexism and structural racism. A 44-year-old white respondent, for example, pointed out that "the play addresses a subject that is still part of a woman's life and that increasingly comes back to haunt us: the oppression of men" and a 16-year-old mixed-race respondent said the message of the play is to "criticise the way men still treat women".

As the show's central motto, the dyad between being silenced and speaking up resonated among the audience. The theme of silencing entered the analysis as a cognitive dimension, since it reflects a critical view of reality regarding the oppression and subordination socially imposed on women, especially black women. The speaking up was categorised in the political dimension because we understand that it occurs through a process of engagement based on an awareness of the situation of silencing. For some spectators, the silencing brought discomfort, as in the case of the 17-year-old black woman who stated that she "was uncomfortable about the beginning when the women were silent", and the mixed-race 40 years-old woman who criticised the fact that "the woman could not speak. Only men have a voice and do everything".

The statement of a 17-year-old white girl, when saying that "many are silent out of fear" establishes a dialogue with Lorde's reflections [1984]. When discussing silencing, Lorde states that what is feared is visibility, without which it is not possible to truly live: "we have been brought up to respect fear more than our need for language and definition, but if we wait in silence for courage to come, the weight of silence will drown us" [Lorde, 1984, p. 44]. Bento [2022] addresses the pact of whiteness, a system of symbolic and structural privileges that contribute to the social construction and reproduction of racial prejudice, in which the white subject sees others and himself/herself in a position of power. In addition to exploring the significance of the place of speech, the author also delves into the concept of breaking the constructed silence, which serves to dismantle a violent hierarchy of power.

Speaking up has an expressive impact on the public's perceptions of the play, as we found in the statements of an 18-year-old black woman, who claimed that the play serves "so that women do not remain silent or allow themselves to be silenced and belittled in any situation" and a 41-year-old mixed-race woman, who stated that "the play shows that the woman does have a voice and a chance". The responses of these women resonate with the theoretical questions of Anzaldúa, who explores the reasons for silencing non-white women. Anzaldúa [2000] challenges the fear that white men (and women) have of the prospect of breaking stereotypes and comfortable roles for the perpetuation of the pact of whiteness: "Why do they fight us? Why do you think we're dangerous monsters?" [p. 230]. The researcher also speaks out against domestication and the erasure of their identities and powers, evoking that women write with their *tongues of fire* [Anzaldúa, 2000].

It should be noted that few statements explicitly pointed to racism as the main message of the play. The responses that directly mentioned this theme came from a 17-year-old black woman, who thought that "the play explained how racism against black people is" and, when talking about the message of the play, that "everything in the world carries prejudice against black women" and a white teacher, mother of a black girl, who reflected on "the future of women, especially black women". Although the cast of the play is intentionally formed by black women, the racial issue is not explicitly discussed in the text of the show, which may explain, in part, the infrequent emphasis on racism in the respondents' comments. This does not mean, in any way, that the racial dimension of the show, inserted in its aesthetic-theatrical fabric, has not produced effects and meanings in its spectators. However, to gain a better understanding of this aspect from the standpoint of the audience, a more in-depth analysis is required, specifically exploring the dimensions that intersect with the racial issue, such as the mention of ancestry and traditional knowledge of women in the narrative of the show.

Within the political dimension, according to the public's perceptions, sisterhood among women is the message of the play. This was noticed by a 16-year-old indigenous girl, for whom "a lot of the play covers things that happen nowadays, showing that women are stronger together". Strengthening the chorus of "unity makes strength", a 59-year-old teacher claimed that the message of the play is the "strength of unity", while a 33-year-old mixed-race respondent stated that the play is about "strengthening female unity". We consider sisterhood as synonymous with a relationship between sisters, representing union, affection, or friendship between women. Although this term may take different meanings in the media

discourses, sisterhood has often been associated with an "ethical-political stance developed from sociability among women in a patriarchal world". It is also regarded as a tool capable of mobilising political actions and the union of women's strength in favour of feminist goals [Leal, 2020, p. 23].

The analysis of the spectators' responses reveals a rich and diverse reading of the play. However, within such richness and diversity, the construed meanings all converge to one reflection — which can be both broader or more restricted — on the concept of female empowerment. This seems to suggest that female empowerment is a strong presence, perceptible or not, in the daily life of the public consulted in our study. Starting from the audience's previous connection with the theme and with a series of languages and resources specific to the performing arts, the play was able to engage the spectators in the debate on structural sexism in an empathetic, cognitive and propositional way. In addition, the show urged the audience to act and transform their reality, in line with the notions of public engagement in science and female empowerment to which we align ourselves in this work. Given that sexism, institutional and structural racism persist as ongoing forms of discrimination in the scientific-academic environment, these diverse levels of engagement can provide a more positive approach and a greater identification of young women with the sciences. This, in turn, contributes to strengthening the connections between them and the different layers in society.

Final remarks

The reception study was conducted with representatives of the school audience of the play *Cidadela* at the Museu da Vida Fiocruz. It highlighted a pleasant theatrical experience and a positive appreciation of the show by this audience, who, as mentioned earlier, is not used to going to the theatre. In this sense, the positive experience gains even greater relevance and can lead to a greater enjoyment of both science communication and the performing arts, contributing to the expansion and diversification of their audiences.

The engagement with the theme — structural sexism — through the play was also highlighted in the responses analysed. In their responses, young people recognised that the theme was relevant and current, in addition to reporting that they identified and connected various scenes with their daily life. We also noticed that the play encouraged them to reflect on several dimensions of female empowerment, particularly the psychological dimension — of empowering oneself for autonomy and self-esteem — and the political dimension — of awareness about the silencing of black women and the demand for voice and expression. Thus, the results presented make explicit the potential of theatre as a language capable of sensitising, evoking emotions and engaging young people in the strive for autonomy and freedom, which, in our view, is fundamental for young women to get closer to science and foster a deeper sense of identification with the field. More broadly, our research reinforces the potential of the performing arts to contribute to the promotion of more equitable and inclusive science communication and to promote the engagement of diverse audiences in the debate on cultural and social aspects of science, searching for a more equitable society, inside and outside the scientific field.

Considering the context in which the play was produced, it is worth highlighting the importance of regarding museums and science centres as spaces for science

communication committed to an intersectional and decolonised feminist perspective. This approach would be embedded into the choices related to the activities developed by these spaces, as they would imply issues of equity and social inclusion, extrapolating the theme of their activities. For example, in the case of the play *Cidadela*, the choice of a cast composed of female actresses, including one transgender and an all-black cast, stands out. Although the issues concerning race/skin colour were not so often made explicit in the statements of the respondents, we believe that they have been key to the positive theatrical experience of an audience that is not used to going to the theatre and is mostly comprised of mixed-race and black individuals. The audience reported a strong identification and connection with the play, indicating the resonance with diverse communities. We concluded by joining with other authors who defend the need to adopt a feminist approach in research and practice in science communication, to give visibility to and stretch the power relations that involve the discussion around science and its communication.

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