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ORIGINAL PAPER

Science identity as a landscape of becoming: rethinking recognition and emotions through an intersectionality lens

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Abstract

In this conceptual paper, I put forward an argument about the conceptualization of science identity as a landscape of becoming by placing emphasis on *recognition* and *emotions*, as core features of identity, through an intersectionality lens. These constructs intertwined, I argue, can give meaning to the process of becoming a science person or forming a science identity, and at the same time shed light on issues related to power, inequality, racism, and exclusion. In the context of these bigger issues, I argue that forming a science identity is not only personal, but also political. The need for intersectionality as a conceptual framework for studying science identity is underscored by the dearth of theory and empirical evidence that addresses classroom inequalities, as well as the multiple and interlocking influence of systems of privilege and oppression in science, such as racism and sexism. Recognition, which refers to how individuals are recognized by others as certain kinds of people, is an ineradicable part of our social world; it is bound within sociopolitical contexts and tied to specific cultural norms, values, beliefs, and stereotypes. Hence, recognition becomes of paramount importance in science identity research. However, critical questions still remain unanswered, such as who is allowed in the world of science and who is recognized as a science person in specific contexts? Directly linked to recognition, I argue, are different types of emotions which can offer a valuable lens for studying inequalities within the process of forming a science identity. What this means for science identity research is how important it is to explore the emotionality of science identity given that emotions are not just dialectically related but inextricably bound with (mis)recognition as well as with various systems of oppression.

Keywords Science identity · Intersectionality · Recognition · Emotions

> The day I went into physics class was death…A short dark man held a little wooden ball. He put the ball on a steep grooved slide and let it run down to the bottom. Then he started talking about let a equal acceleration and let t equal time. And suddenly he was scribbling letters and numbers and equals signs all over the blackboard and my

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> mind went dead…Well, I studied those formulas, I went to class and watched balls roll down slides and listened to bells ring and by the end of the semester…I had a straight A….but I was panic-struck. Physics made me sick the whole time I learned it. - Sylvia Plath in The Bell Jar, (1971)

This conceptual paper is born of questions that emerge from this quote: What science? Whose science? Is everyone welcome to science? How might science (non)participation look like? How might science (non)participation feel? How might we understand the politics of science (non)participation? Can we imagine alternative and infinite ways of being/becoming a science person? This paper aspires to engage readers in an exploration of these questions through the construct of science identity.

Identity has been used to refer to the characteristics of self: Who someone is and the ways in which they present themselves in everyday life. Dictionary definitions position identity in the late sixteenth century and its origins in the Latin *identitas,* from *idem,* which means "the same." Identity then refers to the state or fact of remaining the same one, the condition of being oneself and not another, and the characteristics of determining who or what a person is (Oxford dictionary). A basic formulation of identity would be how one responds to the question: *Who are you*? Two other fundamental questions that are at the core of identity are: How did I come to be? And, how/where do I see myself in the future? These questions suggest the historicity of identity embedded in the past, present, and future. Questions concerning identity have, for several decades, been of interest to researchers in social sciences and humanities, such as philosophy, psychology, sociology, political science, anthropology, gender studies, and education. Different research traditions influenced by various philosophers and theories have taken up different conceptualizations of identity to examine personal identities, national identities, ethnic identities, social identities, cultural identities, gender identities, science identities, and many other identities and sub-identities. Influential to the field of identity research has been Jean Lave and Etienne Wenger's (1998) social theory of communities of practice, which views identity as part of a social practice, and not just an individual and isolated project. A fundamental aspect of their theory is the process of becoming, or the construction of identities, in the context of various communities:

> We define ourselves by what we are not as well as by what we are, by the communities we do not belong to as well as by the ones we do. These relationships change. We move from community to community. In doing so, we carry a bit of each as we go around. (p. 239)

This process of becoming within various communities is at the heart of this conceptual paper, which is concerned with *science identity*, broadly defined as: the perception of oneself as well as recognition by others as a science person (Carlone and Johnson 2007). Science identity has been receiving increased attention by researchers in science education in different parts of the world as evident in the number of publications, edited book volumes, as well as presentations at international conferences, especially in the past decade. Researchers studying science identity have adopted different kinds of theoretical frameworks to conceptualize students', teachers', and scientists' science identities and have used different methods to examine its development. Despite the various theoretical and empirical approaches used to examine science identity, one thing that cuts across these studies is that the construct of science identity offers a contemporary, multidimensional, and valuable lens for exploring (non)participation in science. In what follows, I will argue that science identity provides not only a valuable lens for exploring science (non)participation but

also a lens for better understanding the complexities of becoming a science person which are tied to political, structural, and societal problems. The paper unfolds in four main parts: science identity research, intersectionality, recognition, and emotions. First, I unpack the significance of theorizing about science identity and briefly synthesize existing knowledge. I then turn my attention to putting forward an argument about the need to rethink recognition and emotions through an intersectionality lens.

Science identity as a landscape of becoming

My purpose in this conceptual paper is not to offer a review of existing knowledge base on science identity as that can be found elsewhere (i.e., Avraamidou 2014; Lee 2012; Varelas 2012). Instead, I aspire to put forward an argument about the conceptualization of science identity as a landscape of the *infinite* ways of becoming a science person and rethinking recognition and emotions through an intersectionality lens. I use the term landscape to emphasize the impact of place, defined as the social and cultural dynamics of a space or cultural geographies, on the formation of a science identity. In doing so, I argue that becoming a science person is dependent on the complex mixture of political, social, cultural, and personal relationships which are influenced by the demographics, the politics, and the overlapping of different power structures within a specific landscape. An exploration of how recognition and emotionality intertwine, I maintain, has both theoretical and methodological implications and relate to two crucial questions that deserve further attention in science identity research:

(a) What would it mean to adopt an intersectionality lens to explore recognition and how it plays out in forming a science identity?
(b) In what ways might emotions be linked to recognition and tied up with systems of power and oppression?

In order to respond to these questions, we need to explore through an intersectionality lens how recognition and emotions intertwine and shape the processes of becoming a science person. In arguing for the need to pay explicit attention to how these constructs intertwine through an intersectionality lens, my purpose in this paper is twofold. On the one hand, I want to challenge theoretical notions of the nature of science identity as a single-dimensional concept detached from other identities, ethico-political values, and systems of oppression. On the other hand, I want to argue for the usefulness of intersectionality as both a conceptual and a methodological lens. I want to underscore that failure to adopt intersectional approaches to studying science identity will result in a departure from a post-structuralist approach to a positivist approach to categories (e.g., gender, race, ethnicity, social class, religion) which is both fragmental and limited.

In the sections that follow, I provide definitions of intersectionality, recognition, and emotions alongside a discussion of their potential value in science identity research in light of existing knowledge base. I begin with intersectionality because it might serve as an overarching framework of conceptualizing and examining the role of recognition and emotions in forming a science identity. I then offer a discussion about recognition as a fundamental component of science identity and argue about the importance of adopting an intersectionality lens when examining the role of recognition on forming a science identity. I end with a discussion about the emotionality of science identity, or, how emotions might serve

either as links, barriers, or bridges in the process of becoming a science person. In doing so, I argue that emotions are tied up with recognition, and that adopting an intersectionality lens for examining the emotionality of science identity, we can illuminate the ways that power impacts identity formation at both the interpersonal and structural level. But, before digging deeper into intersectionality, recognition, and emotions, a brief overview of the existing knowledge base of science identity is offered as a way of paving the ground for what will follow.

Science identity

What is it and why does it matter?

Identity-based research has a long tradition in the field of education, and it has begun to make its presence felt in science education as well (Lee 2012). Etienne Wenger (1998) has argued that identity-based research is significant because it offers an ontological approach to learning: "learning transforms who we are and what we can do, it is an experience of identity" (p. 215). Identity is central in this transformative process, as James Paul Gee (2000) has argued, because it permits us to think about the interconnectedness of the individual and the world. Grounded within these claims, researchers in science education have used the construct of identity to study students' science identities (e.g., Calabrese-Barton et al. 2013), teachers' science identities (e.g., Moore 2016), and scientists' identities (e.g., Carlone and Johnson 2007).

A key goal of science identity research is to contribute to an understanding of how science identity might serve in making science learning meaningful and purposeful. A more radical goal, perhaps, is to make the case that science identity, as an ontological approach to learning, is what makes science learning both necessary and possible. In reviewing the literature on science identity research, one thing becomes obvious: There is considerable diversity and variation along conceptualizations of science identity and how it develops over time and across contexts. I cherish this diversity of conceptualizations and I move intentionally and explicitly away from any effort to achieve a consensus or acquire a universal conceptualization of science identity; whether that is what a process of becoming a person should (instead of *might*) entail, or how a science person should (instead of *might*) act. That, in fact, would contradict the very nature of science identity as fluid, tentative, and dynamic. Instead, I argue in favor of the value of maintaining this diversity of what it means to become a science person as well as expanding the repertoire of equally valued science persons. I do so by invoking the (unique) self and science identity as fundamental processes inseparable from the place in which science (non)participation occurs. I hence position myself alongside other researchers who conceptualize science identity as a constant process of *becoming* a science person, instead of a product, a certain desired outcome of being a certain kind of science person. Such positioning provides space for multiplicity, diversity, subjectivity, and hybridity to exist and to essentially acknowledge the infinite ways of becoming a science person—a process that is always bound within place or sociopolitical context. As Dorothy Holland and her colleagues (1998) argued:

> Who one is and who one desires to be at any given moment is always under negotiation and is contingent upon the resources on has access to and the social, cultural, and historical context in which one seeks to author oneself against the expectations of others. (p. 120)

Such positioning allows us to move away from neoliberal notions of a *single* way of being a *certain kind* of person and toward an ethico-political conceptualization of science identity for equity and social justice. As Maria Wallace (2018) argued, "making science people is often over-coded by a territorializing narrative of who and how one ought to become a scientist" (p. 10). Influenced by feminist post-structural theorists such as Elizabeth Adams St. Pierre (2000), I challenge neoliberal ideologies and situate science identity within a broader agenda of science education for promoting equity and social justice and within discussions about what constitutes truth, knowledge, and power. A feminist, post-structuralist, ethico-political frame allows an examination of ways to change power/knowledge relations, the marginalization of specific people (e.g., women of color), and the social, historical, and political factors found within the landscape of becoming a science person. This is precisely where the wider implications of science identity lay. In aiming to address these wider implications, I argue that an examination of recognition and emotions through an intersectionality lens can enable us to move away from the personal narratives of becoming (or not) a science person and toward an understanding of the broader social and political meaning that such narratives might have, consequently affecting social change.

An overview of the existing knowledge base

At the dawn of the third millennium, we evidence an increased and growing interest in science identity research in different places of the world. One line of research in the area of science identity has explored students' science identities and the ways in which their development can be supported. These studies have explored different questions related to science participation which aim to address different goals ranging from attracting a higher number of students to science studies and science careers, to promoting social justice and tackling racial and gender inequalities. Quite a few researchers have used the construct of identity to study who students are in relation to science and why they choose to engage or disengage with science. As Marie-Claire Shanahan (2009) has summarized, some of these studies focused on the identities that students hold outside the classroom, highlighting race, gender, class, and family relationships, and the ways in which these identities affect participation and engagement in science. Other studies focused on the social features of science identity trajectories to examine students' identity negotiations across time intersected by linguistic, racial and economic categories of difference. For example, Jrene Rahm (2016) used the construct of science identity to examine the learning trajectories of ethnically diverse youth through video making in STEM in after-school clubs. Other researchers, such as Nancy Brickhouse and Jennifer Potter (2001), have used the construct of science identity to examine two women's of color self-identification with science in the context of an urban vocational high school. Angela Calabrese Barton and colleagues (2013) explored the formation of young girls' science identities across time and contexts, while Bryan Brown, John Reveles, and Gregory Kelly (2005) used the construct of discursive identity to examine students' discourse and scientific literacy. Collectively, the findings of these studies provide evidence of how complex the process of forming a science identity is and how science identity intersects with various social categories within various contexts. At the same time, the findings of these studies showcase that science identity provides a valuable conceptual construct that allows us to examine the politics associated with being and belonging (or not) in science.

Researchers have not only been concerned with how students form science identities, but also how teachers form science identities and how these relate to their teaching

practices. Researchers have conceptualized science teacher identity in different ways: (a) How teachers view themselves and are recognized by others (Gee 2000); (b) the stories that teachers create and tell about their teaching lives (Connelly and Clandinin 1999); (c) in terms of the communities in which teachers participate, learn, and develop (Wenger 1998); (d) through a gender perspective (Carlone and Johnson 2007); and (e) through a positionality lens (Moore 2016). A few researchers examined the ways in which various approaches, programs, and methods in a variety of contexts influence science teacher identity development (see Avraamidou 2016 for an overview). As described elsewhere (Avraamidou 2014), these programs range from participation in co-generative dialogues (Siry and Lara 2012), informal science experiences (Adams, Miele, and Powell 2016), the use of technology applications (Luehmann 2016), the use of specially designed curriculum materials (Forbes and Davis 2008), and professional development programs (Deneroff 2013). Looking across the studies on teacher identity and identity development, there seems to be a consensus about its nature and characteristics: Teacher identity is dynamic, fluid, relational, contextual, socially constructed, and socially constituted. The collective findings of these studies support the claim that identity offers a powerful lens to studying science teaching and learning because it goes beyond narrow constructions of cognitive processes, it emphasizes the role of context in learning and development, and it allows us to examine the impact of social markers, emotions, and life stories on the formation of teachers' science identities.

Intersectionality

Intersectional approaches to examining science participation

As I argued elsewhere, one of the characteristics of science identity is that it is relational to other multiple identities, for example, gender identity, religious identity, and ethnic identity (Avraamidou 2019). Relationality is influenced by the ethical philosophy of Emmanuel Levinas, which challenges the Cartesian conception of discrete, self-founding subjects, and instead considers the primacy of relationships in the constitution of subjectivity. This concept invites us to rethink our very "being" in the world and to re-conceptualize identity by integrating multiple identities and thereby the individual, interpersonal, and collective levels of self. On this, Audre Lorde argued in (1984):

> As a Black lesbian feminist, I find I am constantly encouraged to pluck out some one aspect of myself and present this as the meaning whole eclipsing or denying the other parts of self. But, this is a destructive and fragmenting way to live. My fullest concentration of energy is available to me only when I integrate all the parts of who I am openly without the restrictions of externally imposed definition. Only then can I bring myself and my energies as a whole to the service of those struggles which I embrace as part of my living. (pp. 120–121)

The question then becomes one of: What kinds of frameworks and tools do we need to examine the relationality, plurality, and multiplicity of science identity? A useful conceptual framework and methodological tool for examining the relationality and multiplicity of science identity, as illustrated in existing knowledge base, is the construct of *intersectionality.*

Intersectionality is used to highlight the inseparability of categories of social differences such as race, gender, ethnicity, and social class. The term was coined by Kimberlé

Crenshaw in (1989) to counter the disembodiment of Black women from Law. Thus, intersectionality captured the inadequacy of legal frameworks to address inequality and discrimination as it resulted from the ways race and gender intersected to shape the employment experiences of Black women. Since then, intersectionality has traveled across disciplinary and geopolitical borders to capture various levels of social reality and inequalities. Theoretically, intersectionality finds its place in post-structuralism and Black feminist thought and offers both a conceptual and methodological tool to study identity through an inclusionary model. An intersectional approach acknowledges the multiplicity of identity, which also has political implications. As Edwina Barvosa (2008) argued:

> Characterized by multiplicity, contradiction, mutual conditioning, situationality, and relationality, multiple identity is a departure from identity as something singular, stable, and definitive…multiple identity can connect people to a number of social groups and communities that can, in turn, potentially become politicized and mobilized in order to achieve particular social justice goals. (p. 113, 123)

Hence, intersectionality calls for an emphasis on the systemic power dynamics that arise as multiple dimensions of social difference interact across individual, institutional, cultural, and societal spheres of influence in relation to women's participation in science (Calás, Ou, and Smircich 2013). It is precisely these power dynamics, structures, and inequalities related to Science, Technology, Engineering, and Mathematics (STEM) participation that researchers aimed to examine through studies framed within intersectionality.

Quite a few researchers have used intersectional approaches for the purpose of examining how the intersection of race and gender impacts science participation. Even though not all these studies have used science identity as a theoretical construct, their findings are important because they highlight both the need and value for adopting intersectional approaches to studying science participation. One example is a study carried out by LaVar Charleston, Ryan Adserias, Nicole Lang, and Jerlando Jackson (2014), who aimed to examine the role of race and gender in the academic pursuits of African-American women in STEM. Framed within intersectionality, the study emphasized the double bind, which refers to the sexism and racism simultaneously experienced in STEM careers. The participants of the study were 15 women, between 18 and 35 years old, registered in an academic computing program, and data were collected through focus-groups' interviews. The analysis of the interviews showed that the participants faced a series of racial and gender challenges related to their educational trajectories. They felt marginalized as persons of color and shared a sense of cultural isolation in departments heavily populated by white men. What these findings essentially show is that power relations and structures exist at the intersection of racism and sexism, as evidenced through the unwelcoming STEM culture, and can only be identified through an intersectionality lens.

With a focus on race and gender, Maria Ong, Janet Smith, and Lily Ko (2018) in a study with 39 women of color aimed at exploring the role of safe social spaces that offer support and enhance a feeling of belonging in STEM. The purpose of their study was to explore the struggles of women of color and the factors that threaten their persistence in STEM. In doing so, the researchers examined the intersectional experiences of women of color as they reflected on their undergraduate and graduate STEM education and the different counterspaces they created or found in search of support. Through the analysis of interview data, the authors identified five different types of counterspaces: (a) counterspaces in peer-to-peer relationships; (b) counterspaces in mentoring relationships; (c) counterspaces in national STEM diversity conferences; (d) counterspaces in STEM and non-STEM campus student groups; and (e) STEM departments as counterspaces. These findings offer useful

insights, especially for STEM departments seeking to be counterspaces for women of color in higher education, such as increasing the visibility of gender and racial/ethnic diversity in departments and creating departmental anti-discrimination policies. These insights would not have been possible to excavate without the adoption of an intersectional approach to study the participant's experiences in STEM.

Simone Hyater-Adams, Claudia Fracchiolla, Noah Finkelstein, and Kathleen Hinko (2018) aimed at developing an operational framework that demonstrates how race impacts the ways that people identify with the physics discipline by picking up differences in the experiences of Black and white physicists. The framework combines physics identity constructs (i.e., recognition, interest, competence, and performance) and Na'ilah Suad Nasir's (2011) model of racialized identity, which includes three different types of resources: relational, ideational, and material. To do that, the researchers interviewed 36 Black and white physicists, including undergraduate and graduate students, postdocs, and professional physicists. The researchers coded the interviews using this combined framework and then examined the frequency of appearance of each of the constructs as well as how the constructs connect to each other. The analysis of the data revealed the following connections: (a) recognition and relational resource connections, often in discussions concerning a relationship with a person, such as a colleague, gave the participants some form of recognition; (b) relational resource and ideational resource connections, where participants discuss an idea that people they know hold about them; and (c) connections between recognition and ideational resources, which commonly occur when participants negotiate their positioning within the physics field. The value of this framework, as the researchers rightly argued, is that it allows us to simultaneously capture the narrative story of participants, while identifying structure and systemic features that impact the ways in which people identify with physics.

What these studies showcase is how gender and science participation is experienced differently by women of color, which points to the importance of examining gender at the intersection with race. As these studies reveal, this is only possible through the use of an intersectionality lens. In what follows, I discuss why intersectional approaches are of paramount importance to science identity research especially when exploring minoritized and marginalized people's science identity formation.

The need for intersectional approaches to examining science identity

The need for intersectionality as a conceptual framework for studying science identity is underscored by the dearth of theory and empirical evidence that addresses classroom inequalities as well as the multiple and interlocking influence of systems of privilege and oppression in science, such as racism and sexism. A call for more explicit attention to intersectionality as a framework for studying engagement with science was put forward by Adrienne Traxler, Ximena Cid, Jennifer Blue, and Ramón Barthelemy (2016) in the context of post-secondary physics education research tradition. These researchers identified three limitations of research that has examined gender differences in participation, performance, and attitudes toward physics. In their words: "This work does not question whether the achievements of men are the most appropriate standard; individual experiences and students' identities are undervalued; and, the binary model of gender is not questioned" (p. 020114-1). In attempting to address these limitations in existing knowledge base, the researchers offered various recommendations, including the adoption of more intersectional and feminist conceptual frameworks, a conceptualization of gender as performance,

and science participation through the lens of science identity. Examples of studies that have examined science engagement through the construct of identity can be found in Anna Danielsson's study (2012) which examines gender performance in the physics classroom in Sweden; Jrene Rahm's study (2016) which explores youth identification with science in after-school programs in Canada; and Allison Gonsalves' study (2014) which examines doctoral students' positioning around discourses of gender and competence in physics in Canada.

While the findings of these studies are important, especially in the context of physics identity, they do not provide insights into how various other identities central to individuals' social positioning, might influence science (non)participation. This is precisely where, I argue, researchers ought to turn their attention to gain a more comprehensive and explicit understanding of the nexus and complexity of how intersecting identities form social positioning and how this intertwines with forming a science identity. I therefore advocate in this paper for a greater, more explicit and critical engagement with intersectionality when exploring science identity for the purpose of addressing inequalities and promoting goals related to equity and social justice. Thus, I invite researchers interested in science identity to further explore what it would mean to adopt an intersectionality lens when examining how people's social positioning influences how they view themselves as science persons and how they are recognized by others. How does social positioning influence individuals' recognition, and place them either as insiders or outsiders in science? How do different people position themselves in the culture of science? How are different people *allowed* to position themselves in the culture of science? Social class, gender, religion, and race are central in these questions and are directly linked to the process of forming a science identity. Adopting an explicit intersectionality lens would provide us with the tools to examine the nexus of social positioning and intersecting identities in light of inequality and oppression—essentially, the political dimensions of forming (or not) a science identity. Positioning myself alongside other researchers interested in how science identity is formed across time and within various sociopolitical contexts, I argue that we need to examine the research possibilities that an explicit framework grounded within intersectionality opens up. This can lead to formulating new conceptions of why and how someone becomes or not a science person, as well as how oppression intersects in someone's lived experiences of forming a science identity. Thus, I contend that an examination of the construct of recognition and the emotionality of identity through an explicit intersectionality lens is of paramount importance.

The imperative of an intersectionality lens to recognition

Defining recognition

Recognition, as defined by Iser Mattias (2013) in the Stanford Encyclopedia of Philosophy, has two dimensions: normative and psychological. The normative dimension refers to recognizing another person with regard to a certain feature, or admitting that the person has that feature. The psychological dimension refers to the fact that in order to develop an identity, individuals fundamentally depend on the feedback of other subjects and of society as a whole. Hence, individuals who fail to experience adequate recognition or who experience misrecognition connected to negative societal norms and values suffer psychological harm as victims of racism and colonialism. What becomes clear in this conceptualization

is that recognition is an ineradicable part of our social world, bound within sociopolitical and historical contexts, and hence, tied to specific cultural norms, values, beliefs, and stereotypes. A typical example is found within the commonly held false belief that science is for men; more precisely, white men. The construct of recognition is connected to political movements (i.e., workers, women, African-Americans) about equal rights and is used to highlight the relational nature of morality and justice. Theories of recognition have been receiving increasing interest by researchers since the 1990s as various groups of people have been engaged in a struggle for recognition, for example, ethnic or religious minorities, LGBTQ+, and people with disabilities. For identity development, recognition becomes of paramount importance. As Charles Taylor (1992) argued:

> Our identity is partly shaped by recognition or its absence, often by the misrecognition of others, and so a person or group of people can suffer real damage, real distortion, if the people or society around them mirror back to them a confining or demeaning or contemptible picture of themselves. Nonrecognition or misrecognition can inflict harm, can be a form of oppression, imprisoning someone in a false, distorted, and reduced mode of being. (p. 25)

Recognition is especially relevant in science identity research because science has traditionally been an elitist world from which certain groups are excluded. As a matter of fact, in a study aimed at understanding the impact of physics and mathematics identities on engineering choice, recognition was found to be the most important construct of identity in predicting a choice of a career in engineering (Godwin, Potvin, Hazari, and Lock 2016). Moreover, in a study aimed at understanding the impact of physics and mathematics identities on engineering choice, Moreover, Martha Bleeker and Janis Jacobs (2004) examined the longitudinal relations between mothers' earlier gender stereotypes and perceptions (students were between the ages of 12–13) and adolescents' later science achievement beliefs (15–16-year-olds) and career choices (24–25-year-olds). The findings showed that mothers' perceptions of their children's abilities are related to self-perception and later career choices of their children. Specifically, mothers who reported higher perceptions of their adolescents' success in mathematics-oriented careers had adolescent children who reported higher mathematics–science career self-efficacy. In addition, boys were found to have higher mathematics ability beliefs than girls despite the fact that girls had higher teacher ratings than boys. These findings point to the crucial role of recognition in the process of becoming a science person and provide useful insights into questions such as: *Whose recognition matters and when*?

Recognition as a core dimension of science identity

Recognition has been conceptualized as a core dimension of science identity (Carlone and Johnson 2007), and researchers have explored its impact on the development of science identity. However, in the context of science identity research, the construct of recognition through an explicit intersectionality lens remains underexplored, with only a few notable exceptions. In an effort to examine how recognition and different sources of it affect students' career choices, Zahra Hazari, Eric Brewe, Renee Michelle Goertzen, and Theodore Hodapp (2017) examine when female undergraduates in physics ($n > 900$) in the USA became interested in physics careers. Data were collected through a survey that examined the participants' reported career intentions, their perceptions of recognition, and the importance of different sources of recognition. The analysis of the data indicated that the highest

percentage of participants became interested in physics careers during high school. Sources of recognition included self-recognition, a perceived recognition from others, and a perceived recognition for other students around them. Interestingly, the most important source of recognition appeared to be the participants' high school teacher, which points to the crucial role of high school teachers in supporting female students develop strong physics identities. Even though this study uses a limiting binary approach to gender and does not pay attention to the diversity among participants (e.g., transgendered, ethnic, and religious minorities), it offers strong evidence about the crucial role of recognition in forming a science identity and choosing careers in science. However, a few important questions remain unanswered, for example: How do different sources of recognition differ for female students who belong to minority groups, such as students of color and Muslim students? An examination of recognition through an intersectionality lens would have provided important insights to questions related to diversity among the group of female undergraduate students.

In an ethnographic study with 15 successful women of color, Heidi Carlone and Angela Johnson (2007) examined the nature of their science experiences over the course of their undergraduate and graduate studies in science, and their science careers, through the lens of science identity. The participants were four Latinas (Mexican-American and Southwestern Hispanic; four Black women (three African-American and one African immigrant); three American Indian women (all raised on or near their respective nations); and four Asian-American women (Taiwanese, Filipina, and Indian, all raised since birth or infancy in the USA). The researchers collected data through ethnographic interviews and follow-up interviews 6 years later, which were analyzed by looking primarily at domains associated with competence, performance, and recognition. The analysis of the data resulted in resolving the participants' experiences into three main categories: those who formed research scientist identities; those who formed alternative (but effective and satisfying) scientist identities; and those whose science identity formation was disrupted by others. The findings of this study illustrated the importance of recognition by others in the three science identity trajectories. There is a missed opportunity in this study and that is that examination of how recognition differed for each of these women. The ways in which their unique ethnic identities and the places in which they were raised influenced their recognition could have been made visible through the use of an intersectionality lens. For example, how did (mis)recognition look for the Mexican-American women versus the African-American women in the USA? In what ways did recognition differ in the various places that the participants were raised and why?

In a follow-up study, Angela Johnson, Jaweer Brown, Heidi Carlone, and Azita Cuevas (2011) examined how three women of color in science professions came to author their identities. The participants in this study were a Black woman, a Latina, and an American Indian woman, all described as "women of color." The researchers analyzed data collected through individual interviews regarding science experiences across their lives from elementary school to the early stages of their careers. The analysis of these data showed that despite the various conflicts the participants had in constructing their science identities, they found settings where they were able to successfully author identities as legitimate science students or professionals, and found places where their racial and gendered identities intersected with their science identities. In addition to recognition, this finding also points to the importance of "place" or the various contexts in which science identities are developed, which are always bound within specific cultural norms, values, and stereotypes that shape how a person might be recognized. What's missing from these findings as with the previous study is an examination of how recognition for each of these women differed

in various contexts. Though all three women are women of color, they embrace different and unique ethnic identities, which probably influenced how they were (mis)recognized by others. An intersectionality lens to recognition would have shed light on how each of these women were recognized in each context and would illuminate the structural complexities of these contexts.

The importance of recognition was also revealed in a study with 17 Latina undergraduate STEM majors, carried out by Sarah Rodriguez, Kelly Cunningham, and Alec Jordan in (2017). These researchers explored how participants developed their STEM identities by focusing on the role that self-recognition and outside recognition played in the process. Data were collected through interviews and analyzed based on Carlone's and Johnson's model of science identity emphasizing competence, performance, and recognition. The findings of this study showed that recognition, both self-recognition and outside recognition, played an important role in the participants' identity development. Recognition from within the disciplinary community was especially important because it was connected to how peers and faculty members invited them into or pushed them away from the STEM community. A few participants of the study also highlighted family as a source of recognition, even though this was not as critical as the recognition from community insiders. While these findings offer useful insights into the role of recognition on the formation of science identity, questions related to the place (i.e., predominantly white institution) and how participants were able to position themselves in that place remain unanswered. For example, a question that might be of interest is whether it matters if outside recognition comes from a professor or a peer who shares the same nondominant ethnic identity? Another crucial question is how social class might impact this recognition. Are, for example, Latina students who belong to a higher social class recognized differently than those who belong to a lower social class?

Exploring recognition through an intersectionality lens

Though a few researchers have examined recognition and its role on the formation of science, in most of these studies intersectionality was used only implicitly, when used at all. This, I contend, has been a missed opportunity for examining recognition as an ongoing experience through which the formation of science identity is validated by the sociopolitical context in certain places. An explicit intersectionality lens becomes of value especially in addressing misrecognition of the multiple and overlapping identities, such as race and gender, in specific places. As Jasbir Puar (2007) argued:

> Intersectionality demands the knowing, naming, and thus stabilizing of identity across space and time, relying on the logic of equivalence and analogy between various axes of identity and generating narratives of progress that deny the fictive and performative aspects of identification: you become an identity, yes, but also timelessness works to consolidate the fiction of a seamless stable identity in every space. (p. 212)

An example of such work in science education framed explicitly within intersectionality and critical race theory is found in Katherine Wade-Jaimes' and Renee Scwartz's (2018) ethnographic study, which examined the kinds of discourses that are recognized in school science. The context of their study was defined by a public school in the southeast USA, primarily comprised of African-American students, and the participants were girls of a seventh-grade science class. The findings of their study illustrated how dominant discourses of

education, science, race, and gender led to the presentation of school science as a collection of facts found in textbooks and which students could only access in class. In terms of recognition, the findings of the study showed that although students tried to engage in scientific practices, they did not receive positive recognition from their teacher. In fact, the students were recognized for copying from sources and memorizing facts, which encouraged a passive and noncreative participation in science, and favored specific types of students. Most of the girls, however, did not fit within that type of student and hence did not receive positive recognition from their teacher. This finding, illustrates how narrow, limiting, and exclusionary the dominant discourse of school science is. As the researchers concluded, "there were no discourses available for students who were, for example, enthusiastic, social, playful, and resilient that would also receive positive recognition" (p. 24). This reveals that African-American girls were positioned as outsiders in science because they did not author and perform specific kinds of identities that would allow them to be recognized as science persons. These findings highlight how the discourses of education, gender, and race intersected as well as how science learning was constructed and who could participate in it. This adds to existing knowledge base about the limited positionalities available for girls in science classrooms by exemplifying the racist elements of discourses that further marginalize and constrain African-American girls. It does so by revealing how dominant discourses about African-American girls are also entangled with discourses that feed white supremacy, making poverty, exclusion, and racism seem inevitable and expected. These findings would not have surfaced had the researchers not used an intersectionality lens to frame their study.

In a study carried out in the UK, Spela Godec (2018) explored how 15 working-class girls between 11 and 13 from diverse ethnic backgrounds identified with science. With data collected through interviews and group discussions with the girls and interviews with their teachers over the period of one academic year, the researcher aimed to explore how working class, ethnically diverse girls negotiate their identification with science? The study was framed within a post-structural gender lens (i.e., gender performance and gender intelligibility) and an intersectional approach in order to attend to the interactions of gender with social class and ethnicity. The outcomes of the analysis illustrated five science-identifying girls, who negotiated their identification and engagement with science through the following discursive strategies: (a) rendering gender invisible, (b) drawing attention to the presence of women in science, (c) reframing "science people" as caring and nurturing, and (d) cultural discourses of desirability of science. As the researcher discussed, while these discourses positively supported girls' identification with science to an extent, the girls had to do a substantial amount of identity work to achieve this. Moreover, the fact that girls reframed science people as caring and nurturing limited their identification to biological sciences and related professions in which care and nurture are central. This is problematic because it reproduces existing gender binaries of biological sciences being a more feminine domain and physical sciences and engineering as more masculine domains with which they would not identify. These findings provide further evidence for the need to reconstruct the dominant culture of science and to broaden the practice of science, and to "make more heterogeneous performances and experiences legitimate and valuable" (p. 13).

In a study situated in the same context, Emily Dawson and her colleagues (2019) examined the experiences of 25 girls aged 12–13, from diverse ethnic backgrounds, in a science museum. Drawing on a post-structural gender lens and intersectional feminist approaches, the researchers aimed to explore these girls' identity performances throughout their visit to the museum, with an emphasis on their gender performance. The analysis of ethnographic data (i.e., participant observation field notes, photographs, and audio recordings) produced

four ways of understanding the girls' identity performances: (a) tensions between "good" behavior and learning science; (b) trying to learn science through performances of a combination of masculinity and "race"/ethnicity; (c) closing down science learning through silence; and (d) performing "cool," drawing on gender, "race"/ethnicity and class. What these four characterizations suggest is that the visits at the science museums left girls in a position of having to negotiate their identity performances for the sake of learning science. As the researchers concluded, "the combination of the museum space and the identity performances seemed to configure valued ways of 'doing science' and 'doing girl' as difficult at best and, at worst, as mutually exclusive" (p. 13). Most importantly, the findings revealed that the girls' performances not only included "doing girl" performances but also included various ways of doing race/ethnicity and class. This understanding of the intersection of race/ethnicity with gender would not have been possible without the use of an intersectional approach to examine these girls' experiences at the museum. Similar to the two other studies described earlier, this study also points to the need for reconfiguring science and science learning practices in ways in which multiples types of identity performances are recognized and valued.

Ultimately, what these studies do is that they reveal the kinds of identities that are allowed, supported, and recognized in different landscapes and they portray who is an insider and who is an outsider to the culture of science. This implies that the process of becoming a science person or forming a science identity is not something that happens *within* individuals, but is something that happens *to* individuals through recognition. Such an acknowledgement calls for rethinking recognition through an intersectionality lens for the purpose of examining the complex mixture of social, cultural, political, and personal relationships in specific places, and how these might allow (or not) someone to become a science person.

The emotionality of science identity

Emotions, identity, and power

In this paper, I adopt Antonio Damasio's (2004) definition of emotion as a subjective experience of some diffuse physiological change, whereas a feeling is a conscious awareness that one is experiencing emotion. In acknowledging the difficulty in distinguishing between the two for the purpose of social research, I fold the two together and treat them interchangeably. More specifically, in agreement with Margaret Archer's (2004) conceptualization, I view emotions as ongoing commentaries on enduring concerns related to at least three levels of existence: (a) natural, which refers to our physical well-being; (b) performative, which refers to our practice; and (c) discursive, which refers to our relationships and interactions with others. Robert Solomon (2007) has argued about the centrality of emotions to our lives:

> We live in and through our emotions. Our lives do not just include episodes of anger, fear, love, grief, gratitude, happiness, humor, shame, guilt, embarrassment, envy, resentment, and vengeance. Our lives are defined by such emotions. (p. 10)

The question then becomes one of why we need to pay attention to emotions when examining science identity? Because as Michalinos Zembylas (2005) and Paul Schutz (2014) have argued, the nature of classrooms is emotional, and students and teachers experience

different kinds of emotional encounters and engage in emotional labor as actors in these spaces. It is within this emotional labor embedded in their engagement with science that students become science persons. By definition then, science identity is emotional given that it involves processes of becoming which are associated with visions of self, goals, aspirations, beliefs, and enculturation in specific social, historical, and geopolitical contexts.

Another dimension that is central to the argument I put forward in this paper is how emotions are bound within power structures, and hence, this offers an important lens to study inequalities in the processes of forming science identities. As Cheryl Mattias (2016) has argued, one must first look into the power structure of emotions because they are not simply innate; they are also socializing projects that are still systematized under a power structure. Likewise, Megan Boler (1999) has argued that emotions comprise a web of complex political relations dependent on the social hierarchies of who is expressing the feeling, who is receiving the feeling, the surrounding structures, and the power relations within that structure. It is precisely at the intersection of power and emotions that an examination of the emotionality of science identity aims to make a unique contribution. Because, if, for example, schools, as is the case in Western societies, are built around capitalism—the supremacy of whiteness, patriarchy, and neoliberal ideologies—then it is the schools, much like the societies, that structure how our emotions are felt, expressed, understood, and valued. Megan Boler (1999) has argued that emotions are about "feeling power" because they are framed within the context of power relations:

> Often minimized, emotions are as key to political life as ideologies. We have feelings about what we think; our thoughts are not detached from our bodies. We have passions that drive us to connect or not connect, to engage or not engage, to respond or not respond. And these feelings are not simply innate or natural. They are constructed politically through social interactions. We are taught that some emotions are appropriate and some should be repressed. The emotions of some are belittled, and the emotions of others are taken as normal or exemplary. (p. 46)

This political dimension of emotions in relation to power and social justice remains largely unexplored in the field of science education and especially in research on science identity, with only a couple of notable exceptions. For example, Maria Rivera-Maulucci (2013) contended that an exploration of the links between emotions, identity, and social justice is especially important in science education because the interplay of emotions and identity "captures the ways in which our beliefs about the world, our school, our classroom, and science may conflict with how they are" (p. 125). In her study with an African-American Caribbean preservice teacher, Maria Rivera-Maulucci explored how the historical development of this teacher's position toward social justice captured the emotions she experienced through this journey. With the use of various biographical data, the researcher examined why the participant decided to become a chemistry teacher, the ways in which her emotions positioned her with respect to issues of justice, and her struggles with notions of oppression and multicultural education. The findings of this study illustrated how emotions and emotional labor are implicated in all phases of teaching for social justice, and highlighted the relationship between teachers' identification, their reflection upon issues of justice, and their response to those issues. As the researcher described, the cycle begins with the perception of unjust systems, when teachers experience emotions, such as anger, frustration, resentment, compassion, or empathy. In the reflection phase, teachers respond to classroom situations in real life and might experience emotional ambivalence as they experience a mismatch between theory and practice. Lastly, in the response phase, teachers make pedagogical decisions. It is at this phase that emotional resistance plays a strong role in

initiating and sustaining teachers' responses. Taken together, these findings illustrate how emotions are in dialectical relationship with the formation of a teacher's identity, especially in becoming a social justice science teacher.

In a study with three teachers whose identities challenge the contemporary discourse of science education, Wayne Melville and Anthony Bartley (2013), prioritizing the notion of power, examined the relationship between emotions and formal power within a discourse environment. With the use of data collected through interviews, the researchers found that specific discursive conditions might assist teachers in constituting identities that challenge the contemporary discourse of science education, namely: (a) existence or development of an environment that immerses teachers in discourse that allows, and actively supports, classroom practices that challenge the apparent contemporary discourse; (b) recognition of the potential power inherent in mandated curriculum documents to direct, and validate, the discursive environment that is working toward challenging the contemporary discourse; and (c) teachers who may lack the power necessary to establish environments of discourse that fully capitalize on their potential influence within the infrastructure of pedagogical science. A key component of these conditions, as the researchers argued, is an awareness of the emotional aspects of teaching, for example, being concerned about the students. In essence, these emotions serve as a means for interpreting and responding to experience (Zembylas 2003). These findings point to the important role of power, discourse, experience, and emotion in constituting identities that challenge the contemporary discourse of science education. While these findings are important for science identity, they do not shed light on how power and power structures might shape discourses about emotions. As Lia Abu-Lughod and Catherine Lutz (1990) argued:

> Power seems to be an integral part of all discourses about emotions, because power relations determine what can, cannot, or must be said about self and emotion, what is taken to be true or false about them, and what only some individuals can say about them […] The real innovation is in showing how emotion discourses establish, assert, challenge, or reinforce power or status differences. (p. 14)

What this might mean for science identity research is how important it is to theorize about and explore the emotionality of identity given that emotions are not just dialectically related but are inextricably bound with recognition and various systems of oppression. And yet, we know surprisingly very little about the emotionality of science identity. Crucially, what appears to be problematic is the fact that power has played a largely unacknowledged role within most studies of emotions and affect in science identity research. The danger of not acknowledging emotions is that forming a science identity becomes a dehumanizing experience. The danger of not acknowledging emotions in relation to power and recognition is that forming a science identity becomes an experience independent of structural, political, and social inequalities.

Exploring emotions through an intersectionality lens

The matter of emotions that most interests me here is how emotions might serve as links between past (e.g., personal histories), present (e.g., social positioning), and future selves (e.g., a science person) by serving as a means of deploying recognition and power relations that essentially position people as insiders or outsiders in science. Such an exploration of the role of emotions on the formation of science identity across time and place, in

conjunction with the structural and political implications of place, is possible through an intersectionality lens.

An example of such work is a longitudinal case study carried out by Felicia Moore (2019) who examined the journey of an African-American female (Michelle) in science teacher education by looking at her educational history from childhood to teacher education and professional life as an elementary teacher with a focus on how she viewed herself as a science learner and as a science teacher. In narrating Michelle's story, Felicia Moore identified a recurrent idea in her understanding of self as being "the only one" as the only Black student in her classes during her schooling years. As Moore argued, this might suggest a psychoemotional burden of having to strategically navigate a predominantly white and racially politicized space. In addition, the science courses were taught in traditional and didactic ways, with which Michelle could not relate. During her university studies, Michelle described "an overwhelming presence of whiteness" even when few other Black preservice teachers were present. This made her feel anxious, discouraged, and drained. The one exception, which turned out to be a transformative experience for Michelle, was her participation in a science methods course, which was taught by an African-American professor. Beside the obvious issue of representation, the course offered opportunities for discussions about the intersection of race, ethnicity, gender, class, and geography and its role on the development of science teachers. Fundamentally, what the course did was to allow Michelle to exist and to be valued, to find her voice as a Black science teacher and to speak about her experiences, to place herself in science, and to see herself as a future science teacher. What is evident in the findings of this study is how Michelle's identity intertwined with emotions and issues related to power, racism, and exclusion throughout her journey in science. Such an understanding would not have been possible without adopting an explicit intersectionality lens in examining the participant's identity formation across time and place.

Another example of related work is found in Nicole Joseph, Meseret Hailu, and Jamaal Sharif Matthews' (2019) study in the context of mathematics education. In their study with ten adolescent Black girls, the researchers sought to explore these girls' experiences in secondary mathematics classrooms and what those experiences reveal about them as mathematics learners. To do that, the researchers used the concept of "humanity" of Black girls, which refers to the "composite of their personal experiences, backgrounds, histories, languages, intellect, personalities, bodies, and physical and emotional well-being" (p. 133). The analysis of the interviews revealed how complex Black girls' learning experiences are, how they challenge popular notions of "smartness" and reinforce the need for specific types of interactions in mathematics classrooms. More specifically, the findings showed that Black girls value collaborative learning as collective learners, which is rooted in the collectivism of Black culture. Why is this important? Because, as the researchers, argued, when teachers utilize strategies that allow for collaborative inquiry, they normalize Black students' humanities and "disrupt a historically White institutional space" (p. 147). For identity research, this becomes of importance because it highlights the intersection of multiple identities: science, gender, and ethnic identities. Moreover, when discussing what "good" mathematics teaching looks like, Black girls described teachers who exhibit an ethics of care and inclusion while acknowledging their vulnerability. While this is important for all girls, it is especially important for Black girls who "tend to be intellectually and emotionally invisible in math classrooms" (p. 144). This complexity and distinctness of Black girls' experiences would not have been possible to understand without an explicit intersectional approach to the framing of the study. Even though the concept of humanity does not draw explicitly on identity research, it becomes of special interest in this paper

because it offers a comprehensive and truly intersectional construct that considers Black girls' personal, cultural, and emotional selves as mathematics learners. As the researchers stated, "Black girls' humanity makes them real—alive, political, and complex" (p. 133). It is precisely this complexity that such a construct might convey of what it means for students, who have traditionally been excluded from science, to attempt to enter the world of science and how that might feel. At the same time, the construct of humanity implies the need to attend to the situated, cultural, political, and emotional nature of students' experiences, especially those who have been historically constructed as outsiders in science.

Drawing from the findings of these two studies, I want to underscore the importance of examining the emotionality of science identity through an intersectionality lens for the purpose of understanding how intersectional identities (or humanities) come to be constructed, recognized, and politicized. An exploration of how emotionality is tied up with recognition, which is fundamentally tied to power, might illuminate the ways in which power structures impact identity formation in different places. Hence, I propose to draw more strongly, systematically, and explicitly on intersectionality when examining emotions in science identity research, as we aim to better understand how minoritized and marginalized groups negotiate, embody, and enact their emotions while they attempt to enter the elitist world of science. It is only when we acknowledge the complexity and political dimensions of emotions that we can explore how "difference" and "sameness" are negotiated in the lived experiences and processes of becoming a science person in various places.

The future we desire: a *whole* self

In this paper, I put forward an argument for conceptualizing science identity as a landscape of becoming with a forthright focus on intersectionality as a framework for examining recognition and emotionality. As shown in a recent study of mine, beginning in childhood, we start forming our science identities, which are shaped and re-shaped in different ways throughout our lives and filtered through our unique life stories (Avraamidou 2019). But, are we ever able to divorce our science identities from our other multiple identities? Is someone ever *just* a science person and not a science person, a mother, a working class, a transgender person, a Muslim, an African-American, a refugee, and so on and so forth? In this paper, I have argued that it is important that we examine science identity not in isolation but in conjunction with our other multiple identities for the purpose of extrapolating a more comprehensive and intersectional image of a *whole self*. The process of becoming a science person is fundamentally a negotiation between our desired identities and the ones assigned by others, which for disadvantaged and underrepresented groups, quite often, these identities are in conflict with each other due to existing systems of oppression, inequalities, as well as social stereotypes. This negotiation between self-view and recognition by others, however, does not take place in an emotional vacuum. Instead, this process entails a high emotional labor in which individuals immerse themselves. But, what might this mean for science identity research? I would argue that this points to the need for carrying out longitudinal and intersectional studies in order to disentangle the ways in which recognition and emotions relate to each other, and to look at how they impact science identity formation within specific geo-sociopolitical contexts in light of the realities of inequality and exclusion that these contexts might entail.

In the introduction of this paper, I posed two questions that I revisit here in an attempt to provide answers that might serve as a springboard for future research. The questions posed invite us to consider the value of the constructs of intersectionality, recognition, and

emotions in studying science identity and its development. With evidence drawn from studies about science identity, I have argued that intersectionality can provide us with a lens to re-conceptualize science identity in conjunction, and not in isolation, with other identities, and to examine how these intersect with each other and either support or hinder the process of becoming a science person. What this actually means in practice is that intersectionality provides us also with tools to explore questions related to power structures, inequalities, racism, sexism, and exclusion of specific groups from science, for example, Black girls. The first question suggests the imperative role of intersectionality as a lens to recognition and an exploration of how recognition might intertwine with the processes of becoming a science person in different places. Using an intersectionality lens to examine how recognition plays out in this process will provide us with an understanding of not only how one becomes a science person but also of why one does not become or un-becomes a science person. Recognition, however, as evident in empirical research, is not detached from emotions. As a matter of fact, it is these recognition-driven emotions, positive or negative, that might serve as inclusionary or exclusionary resources for becoming a science person. This is what the second question invites us to explore alongside questions related to how emotions entangle with recognition and power, for example: *How does marginalization affect people's emotional trajectories as they attempt to form science identities? Whose emotions are recognized and valued in specific science places*?

In essence, the emancipatory potential of rethinking the constructs of recognition and emotions through an intersectionality lens when studying science identity is that these constructs provide us with both the frames and tools to study science identity in the context of bigger questions related to equality, equity, and social justice. This is, I argue, where researchers ought to turn their attention in order to contribute to a renewed conceptualization of science identity for social justice, framed within an ethico-political and intersectional frame that aims to tackle inequalities and resist neoliberal paradigms of reform in science education. From a theoretical perspective, this would require an adoption of post-structuralist, postcolonial, critical race theories, and feminist approaches to science identity research for the purpose of promoting social change and social justice. From a methodological perspective, this would require moving away from hegemonic research traditions that use, as Lisa Bowleg (2008) has argued, additive identities (Black + woman + low income = poor Black woman) and categories to characterize individuals. Instead, researchers should adopt intersectional multi-methodologies and tools, such as narrative and critical reflexivity that capture individuals' lived experiences in science within various socio-political contexts.

To recapitulate, beneath the specific contributions that an examination of recognition and emotionality through an intersectionality lens is capable of making, lays one more fundamental. Such as an examination can give meaning to the process of becoming a science person and, at the same time, shed light on issues related to power, inequality, racism, and exclusion. In the context of these bigger issues, science identity is not only personal, but political as well. Intersectionality, recognition, and emotions provide us with opportunities to dig deeper into this political dimension of science identity because they highlight the complexities and ambiguities of becoming a science person in-between spaces, within hybrid places, and outside traditional, normative discourses. At the same time, these constructs illustrate how science identity is formed "on the move" across time and place as life is full of transitions and heterogeneities. Concluding, in thinking about the personal and political dimensions of becoming a science person and forming a science identity, we must strive for the analytic over the descriptive for, as with any landscape, in science identity what is on the surface typically reflects a tiny fragment of what lies below. This is precisely

what intersectionality, recognition, and emotions can do: Offer the lenses and tools to not only eliminate narrative boundaries imposed via superficial identity categories, but also examine the complexity and hybridity that lay below the surface of science identity. Science identity is not an identity on its own; its meaning derives from a complex, polycontextual, emotional, and intersectional self.

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