

## Chapter 3

# “It Was Always About Relationships and It Was Awesome”: Girls Performing Gender and Identity in an Out-Of-School-Time Science Conversation Club



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Girls' engagement with science in structured afterschool programs has received much attention, particularly in relation to opportunities that these programs offer to engage girls in science learning that is meaningful to them and helps them to claim identities in science. (e.g., Calabrese Barton et al., 2013; Carlone et al., 2015; Gonsalves et al., 2013; Thompson, 2014). This chapter documents an attempt to bring science into an afterschool space, and to determine what contributions, if any, it made towards girls' science literacy development for life. Recent research on girls' participation in science suggest that reasons for girls dis-identification with science could be related to gendered representations of scientists that limit opportunities for girls to see themselves as scientists (Archer & DeWitt, 2017; Francis et al., 2017). From this perspective, out-of-school-time (OST) science programs for girls have the potential to disrupt representations of science as disconnected from girls' lives, and can create possibilities for girls to begin to make claims of identities as “insiders to science”, at least temporarily (Rahm, 2010). Following these concerns about girls' identification with science this study explored the tensions between girls' performances of femininity and their engagement in conversations about science in a girls group activity, *ConvoClub*, held in a youth community program. In this chapter, we offer a critical analysis of engagement with science in the *ConvoClub*, paying particular attention to the manner the girls negotiated that space, its activities and science. We document opportunities that the girls had to position themselves as insiders to science in ways that demonstrated how local forms of

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capital (Bourdieu, 1986; Yosso, 2005) are valued in the OST space, and the exchange value these may have in other educational spaces.

ConvoClub is a program at the Cartier Community Centre (CCC) embedded in a Montreal community with a long history of poverty. This research site was part of a larger multi-sited ethnography in which we explored science literacy development and identity work among diverse youth as they engaged with science outside of school. The CCC has been in existence since 1956, with deep roots in the Montreal Anglophone community. While the neighbourhood is gentrifying rapidly and the population it services is changing, it is still predominantly an Anglophone centre, in an increasingly Francophone community. The neighbourhood is historically a working-class Irish-Quebec community. As the community changes, it has welcomed a growing immigrant population, due to its (previously) affordable housing. Thus, the demographic of youth attending the community centre has changed, and has become increasingly diverse, both ethnically and linguistically. The CCC offers bilingual (French and English) programming to youth ages 0–17, and invites alumni of their programs to act as volunteers or paid counsellors for camps and youth groups. Often youth enter in the toddler program and stay until they age out of the programming. Darlene, the program coordinator described the program in the following way:

We see different people come and go, they graduate, and some older people pass and it's very [focused] on the community, and that means family, and a lot of the youth and a lot of kids and some of the older ones, they don't have family and CCC becomes their family. So, it makes our job more difficult, but much more, I guess, rewarding. (INT 1)

One of the goals for the program coordinators at CCC is to create a positive space for youth where they can build self-esteem, positive images of themselves, and develop community or “family”. But Darlene suggests that these goals are secondary to ensuring the youths’ safety:

The biggest need is for them] to eat. They're all poor. They- poverty, yeah, they are poor. To eat. To eat and learn. 'Cuz right now it's survival. You know, it's not even about self-esteem, it's survival. I'm talking about having more than one meal. 'Cuz a lot of them are siblings of seven. And the oldest one usually don't eat. So, the biggest need I find is for them to have a place to feel safe, to have somebody to believe in them and to eat. It's a family, that's the biggest need. If they ca- if their own family can't offer that. At CCC, during these four hours, if we have muffins or spaghettis and we cook and that's their meal and then we check their homework to make sure it's done, ask about their day, that's it. It's survival They're struggling. (INT 1)

At the time of the study, CCC was male-dominated. Seeing a need to support girls in the club Darlene proposed the creation of ConvoClub to support girls as they navigate the pressures of adolescence and “sit in a circle and just talk about life and ask questions from a hat, anything like that” (Darlene INT-1). We approached Darlene and the ConvoClub with the intent to offer youth driven science programming and to provide human and material resources to engage in personal and science explorations in the form of digital storytelling and video documentary. The girls were receptive to these opportunities and we spent 12 weeks documenting their engagement with stories about self and self in science (see Gonsalves et al.,

2013 for details of activities). Previously, CCC had offered science activities occasionally, by relying on instructors brought in from local community organizations, or volunteers who assisted youth with science fair projects. Infrequently, science activities were offered during day camps or on weekends. Those science activities, like the ones we engaged the girls in, were often offered in the contexts of other on-going activities and were driven by larger educational goals than science literacy.

The structure of the program sought to flip the traditional view of adolescents as consumers of science, and instead attempted to capture emergent forms of engagement with science that demonstrated instances of youth voice. In this chapter, we explore to what extent the program became a place supportive of “youth-powered science” where science begins from questions youth bring to the program (Seiler & Gonsalves, 2010). Youth-powered forms of science engagement can provide critical opportunities for exercising “youth voice” by allowing youth choice and ownership of science (Basu, 2008) which can broaden youths’ concepts of what counts as science and what identities in science are available to them. These opportunities can make insider identity work possible for youth, often for the first time (Gonsalves et al., 2013; Rahm, 2010).

### 3.1 Theoretical Framework

This study draws on three related theoretical framings. First, to understand how girls *do* identity work and position themselves in relation to science, we draw on Holland et al.’s (1998) theory of identity-in-practice. This framing views learning and identity work in STEM as an ongoing and dynamic process and thus we are interested in documenting “persons taking form in the flow of historically, socially, culturally, and materially shaped lives” (Holland et al., 1998, p. 5). Thinking of girls as constantly doing “identities-in-practice” (Holland & Lave, 2001) gives us the possibility of exploring the multitude of ways girls are positioned but also position themselves in relation to science. This theoretical focus to our analysis gave us the possibility to identify moments when certain enactments (e.g., performances of femininities) permitted the girls to position themselves as insiders to the ConvoClub, but also as “insiders to science” (Rahm, 2010). Considering simultaneously how girls navigate discourses of gender and its intersections with ethnicity and social class can offer still further insights into who can be in or outside of science (Carlone et al., 2015). For example, Godec (2018) argues that science identities are considered appropriate for girls in some contexts, but inappropriate in others. In her study exploring working-class girls’ identity work in secondary science, “scientist” is configured as an appropriate subject position for South Asian girls in certain cultural and social contexts (e.g., Baker et al., 2008), but is regarded as culturally inappropriate for White working-class girls. Thus, to understand the identity work of girls in the ConvoClub we need to account for the ways that identity performances as insiders-to-science were recognized both in the context of the club, and in light

of their ethnicity and social class. To understand performances of femininity, we draw on post-structural feminism and the work of Judith Butler (1999).

Butler (1999) envisions gender as something that is *done* through behaviour, dress, forms of speech, their preferences, interests and other enactments. Following Butler (1999), we see gender as constructed through a “stylized repetition of acts” like behaviours, dress, speech, interests and other enactments (p. 140). Thus, in this orientation towards gender, we understand performances as situated in local contexts (Paechter, 2007). As such, masculinities and femininities are often understood as ideal, typical forms that are associated with how to ‘do’ boy/man or girl/woman (Paechter, 2007). We caution that this orientation to gender does not suggest that performances of masculinity or femininity are signifiers of male-ness or female-ness. Furthermore, enactments of masculinities and femininities might be acceptable or intelligible in some contexts, but not in others (Butler, 1990). For instance, femininity has been constructed as incompatible with science in its female embodied form (e.g., Francis et al., 2017; Gonsalves, 2014). Francis et al. (2017) have demonstrated that youth and parents alike identify constructions of femininity as “superficial” and associated with an overall denigration of girly/super-feminine girls. In a recent study, Godec (2020) describes forms of hyper-femininity that involve an investment in personal appearance, flirtatiousness and popularity. Godec (2020) argues that this form of femininity is often reprimanded and at odds with science, and therefore in contexts where performances of hyper-femininity are rewarded, girls will reject science. Dawson et al. (2019) have also described a form of hetero-femininity which interacts with science identity performances. Hetero-femininity in this case is a form of popular femininity invested in being heterosexually attractive through appeals to fashion, beauty and sociability (e.g., Dawson et al., 2019). Taking this into account, we are concerned with understanding how science identity performances are intelligible in an OST science learning context like the ConvoClub where performances of hetero-femininity are valued (Read et al., 2011). We agree with Archer et al. (2019) that intelligibility is a helpful tool for understanding femininity in relation to youths’ science identity performances, as it may reveal the normative or dominant values that are recognized or valued in a given context. Applied to this study, this led us explore how the young women *do* gender in relation to local, valued forms of popular femininity (Read et al., 2011), and how the intersections of these with science produces locally intelligible performances in the context of ConvoClub (e.g., Godec, 2018). Performances are considered to be ‘intelligible’ (Butler, 1990) when they align with the expected appropriate behaviours for girls or boys in various contexts.

Third, we are interested in exploring what forms of capital (Bourdieu, 1986) are valued, produced, and exchanged in the ConvoClub and within the context of youth programming at CCC generally. We sought to parse out the various ways that girls locally accrue various forms of capital *in the context of the* ConvoClub, and what exchange value these have for recognition outside of the club (Gonsalves, 2014; Gonsalves et al., 2013). We are curious whether dimensions of *science capital* (Archer et al., 2015) are produced and valued in the ConvoClub, and whether they

are leveraged in and beyond the club. We are also interested in what forms of capital render youths’ identity performances intelligible (e.g., Butler, 1990) in this context. Science capital is understood as science-related forms of social and cultural capital which students may accrue both in and out of school. To examine the forms of science capital valued in the ConvoClub, how they intersect with the girls’ performances of femininity as intelligible identity positions, we consider the possibility that these would have currency in mainstream science education spaces. Thinking more broadly about forms of capital in the club, we also draw on the work of Nasir and de Royston (2013) who discuss the value of *bonding capital* among groups of African American students, and how it served as a source of status and facilitated identity work in relation to mathematics in the program they studied. Bonding refers to the value assigned to the development of social networks among groups. Nasir and de Royston (2013) have suggested that this happens within groups that have some homogeneity in social identity, but we also suggest that bonding may happen over common interests held by group members. Bonding capital emerged as salient in this study as we considered how identity performances (involving performances of femininity) were rendered intelligible within the group in ways that were valued among group members. Thus, we mobilize the concept of capital in the study to explore instances when the girls engage in identity performances that accrue locally valued forms of capital among club members. We then consider the possibility that the forms of capital valued among club members can be exchanged for intelligibility and recognition as insiders within the club, and the possibilities for exchange-value outside of the club.

Taken together, these three dimensions of our theoretical framework enable us to explore girls’ engagement in identity work through science conversations in the ConvoClub. We use the term identity work to signal that we understand identities as produced in practice, by being positioned and by positioning themselves relative to science and to others in the club or the world (e.g., Holland et al., 1998). In the context of ConvoClub, science conversations may have enabled girls to position themselves as certain kinds of people (Gee, 2011; e.g., science people, as girls, as friends, as insiders to the club, and a variety of other subject positions that are valued within the ConvoClub context). Identity performances in this context are constituted in relation to locally recognizable and valued forms of femininity (Paechter, 2007), which also work to signal *inside-ness* to the club. Inside-ness in the club may also be constructed through the accumulation of locally-valuable forms of capital – taking the form of bonding capital or science capital, with both having exchange value for recognition within the bounded context of the ConvoClub. This framework led to two research questions which then guided our analysis:

1. What identity performances are valued among girls in an OST science conversation club?
2. What do these performances reveal about the potential for the development of durable science identities in these contexts?

## 3.2 Research Context and Methods

The study took place over a semester, and entailed co-planning events with the ConvoClub coordinator, and at times with the girls. As we were interested in doing more than just describing and interpreting the events of the club, we endeavoured to work with participants to arrive at science-related experiences that might be transformative for the youth involved. Thus, we sought to identify aspects of science learning that were alienating to the girls, and aimed to reframe those aspects through methods that would encourage the expression of the girls' voices (e.g., mini-documentary making; Furman & Calabrese Barton, 2006), and thereby make the science relevant their lives (e.g., Seiler, 2001). This chapter draws on ethnographic data (video data of meeting sessions, fieldnotes, group discussions, individual interviews) collected from all the activities we engaged the girls in throughout the semester-long program (weekly meetings of 2 h over 16 weeks). Seven youth participated in this study, with six youth completing all the activities over time. Three of the participating youth were attending ConvoClub for the first time, and four had participated in the group previously. Participating girls all came from working class backgrounds, one had just moved out from the foster care system. The oldest of the group, Shanice, was of Black Caribbean descent, and worked as a volunteer in the youth program. She had recently moved to a different, slightly more affluent neighborhood, but she continued to travel to the youth program at CCC because she had become interested in a career as a social worker and wished to gain experience working with youth. Sharon, Kelly, and Caileigh are all between the ages of 17- and 18-years old, from Irish-Canadian backgrounds. They each participate in the teen program, but also volunteer their time in the 5–12 program. Sarah is the youngest of the group at 13, and is also of Irish Canadian heritage. Karen is biracial (Irish-Canadian and Jamaican-Canadian background), 14-years old at the time of the study, and like Sarah, participates in the Teen program only. Sarah and Karen had been involved in youth programming at CCC since they were 2-years old, and were best friends. Both of their mothers were also graduates of the youth program at CCC. Pseudonyms are used for the youth, the program facilitator and volunteer, the program and the centre to ensure confidentiality.

The activities at ConvoClub took many different forms, and ranged from sharing personal narratives through digital storytelling (Robin, 2006), to mini-documentary making (e.g., O'Neill, 2005). The following table (Table 3.1) details the activities offered on a weekly basis over the course of a 12 week semester. In the table, we describe the activities that took place each week that we visited the ConvoClub, and the manner the data source, once analysed, touched upon one of the three themes summarized in results in this chapter. Data collected in weeks 1–12 include video data and artifact data, whereas in weeks 16–18 we collected interview data. The final column indicates the themes (1, 2, or 3) in which the data figured most prominently.

**Table 3.1** Timeline of activities associated themes

Week	Activity	Description	Data source
1	Postcard storytelling	Youth drafted a story about their hair to fit on a postcard. We chose to write stories about hair because they were stories of concern to the group members, and can touch on issues of culture/ethnicity, sexuality, gender identity and self-esteem. This was a ‘practice-run’ for drafting a personal story that was short and succinct	
2	Storytelling circle	Youth shared personal stories with others in the group, the group spent time asking questions and giving suggestions to refine and develop the stories for the digital storytelling activity	Themes 1, 2
3	Polishing stories	Youth worked with each other and the research team to polish stories and collect images/music for digital story	Themes 1, 2
4	Story recording	Stories were audio-recorded / finalized image selection/ populated Windows Movie Maker with images	Themes 1, 2
5	Workshop on video editing	Lesson on cross fades, volume control, zoom and pan functions, title overlay, credits. Hands-on time to edit sound files, and images	
6	Final cut and film screening	Last minute changes to stories, then we ordered pizza and screened the stories in the computer room at the centre	Theme 1, 2
	Break	Research team arrived at CCC <sup>a</sup> but youth were overwhelmed with school work and needed a break	
7	Collage activity	Where do we see science in our everyday lives? Research team brought in magazines, and youth created collages to discuss the everyday ways that science is important in their lives	Themes 1, 2
8	Presentation and concept mapping	Mapped out the ways that science is present in our everyday lives	Themes 1, 2
9	Brainstorm for mini-documentary	Youth decided they wanted to continue working with digital technology, and make a mini-documentary. We discussed the goal of the project and its form. Decision was taken to interview other youth at the centre, development of interview questions	Themes 1, 2
10	Streeters	Finalized interview questions for the video project. Quick lesson on filming and then youth conducted interviews with volunteers and other youth at CCC. As a group, we viewed and discussed interview footage	Themes 2, 3
11	Story boarding and editing	Youth created the storyboard for the film, and then worked in groups to edit footage for three different ‘scenes’ of the film	Themes 2, 3
12	Final cut and screening	Merged the three scenes and screened the final production!	Themes 2, 3
16–18	Interviews	Individual interviews were conducted with each of the participating youth, and the group coordinator	Themes 1, 3

<sup>a</sup> Cartier Community Centre (CCC) = XX



### 3.3 Data Sources

As we were concerned with the identity work the girls engaged in, over the course of the ConvoClub, we designed our data collection to capture various aspects of identities-in-practice. For example, video data was collected in the manner of Baker et al. (2008) describe, as we intended to explore the participants' "discourse-in-use" to then infer the girls' identity work by exploring how they perform gender and identity in science, yet also how they are positioned and in return position themselves in light of discourses around gender and science. Each session of ConvoClub (12 weeks) was video-recorded, leaving us with approximately 23 hours of video data. Written fieldnotes accompanied the video data (Hammersley & Atkinson, 2007), which helped us to plan events from week to week. Field notes were also mobilized analytically, to identify episodes that we interpreted as meaningful to the girls' identity work (e.g., moments that illustrated identity work around science; positioning and being positioned around locally-valued forms of femininity). Episodes of interest were then transcribed verbatim. Semi-structured videotaped interviews (Kvale, 1996) were conducted with each of the girls and the program coordinator at the end of club year. They were transcribed verbatim. Artifacts were also collected such as collages, storyboards, informal notes and the video documentary. These artifacts became important sources for our analysis of identity work as they allowed us to investigate identity expressions that went beyond the discursive. For example, the girls' collage activity yielded science-related themes that were also connected to their persistent interests as adolescent girls. Analysis of the collage activity data entailed extracting themes from the collages (often related to forms of 'hyper-femininity' and 'hetero-femininity', e.g., Dawson et al., 2019; Francis et al., 2017), and integrating these with the analysis of the conversation around the collages.

Analysis entailed a bricolage of the multiple data sources (Kincheloe & Berry, 2004). First, data was coded in NVivo9 and an initial content analysis of fieldnotes and video data was conducted to identify performances across the various activities. We began with open-coding (Saldaña, 2015) using primarily in vivo codes that we organized into three broad categories: (1) goals of ConvoClub; (2) descriptions of "doing science", and; (3) positioning hetero-femininity in opposition to science. Within each of these three broad categories, we then drew on our theoretical framework to examine which of these emphasized relationships (Nasir & de Royston, 2013), revealed aspects of science capital (i.e., experiences with science and opportunities to do science out of school; Archer et al., 2015), and episodes when the youth used science conversations to perform the forms of femininity they were invested in (Butler, 1990). This yielded the three themes, situated around various activities the girls engaged in during our time together. We then performed a more theoretically focused round of analysis and paid attention to broader meanings of gender, identity and science as constructed through talk and performed in action (Gee, 2011). We identified performances of femininity that seemed to be valued in the group, and what affordances these performances gave for positioning oneself as



an “insider to science” (Rahm, 2010) and gaining recognition as a science kind of person (Carlone & Johnson, 2007). Finally, we queried whether these performances yielded affordances tied to locally-valued forms of capital.

## 3.4 Results

Our analysis revealed three different themes tied to the girls’ identity performances in the group and their orientations towards science:

1. Building solidarity around ‘relationships’
2. Co-opting science to advance the goals of ConvoClub
3. Positioning selves as science experts in the club

Across each of these themes, we saw the girls performing identities that seemed to have significant value within the context of the ConvoClub. Data analysis demonstrates that performances of ‘pretty popular femininity’ (Read et al., 2011) influence how the girls position themselves in relation to science, and how they author themselves as members of the ConvoClub group.

### 3.4.1 *Building Solidarity and Bonding Capital Around Relationships*

We saw the girls’ investment in relationships as driven by their performances of ‘popular femininity’ (Read et al., 2011) which emphasized heterosexual relations, and a strong focus on appearance. In an interview with Caleigh, we asked her what she enjoys most about being in ConvoClub. She responded:

Probably... Probably relationships. Like everyone was always talking about how “oh, I’m (now into) a relat- relationship with this guy, and they changed my life”. It was always about relationships and it was just like- it was awesome. It was the most fun to hear everybody talk about something that bothered them, or something that pissed them off, made them upset, ‘cuz- like I have my own problems and to hear everyone else’s problems in my mind was just- I just get really upset, but then it was like- It was also funny to hear them, ‘cuz they were funny (INT- C1).

This theme was most apparent in the digital storytelling activity, an introductory project which was meant to provide a way for the girls to connect to each other personally, and to “dig deep” as the teen group coordinator put it. Table 3.2 offers a list of the titles and subjects the digital stories addressed. At the same time, as researchers we introduced the activity to familiarize youth with digital media production and story-writing. In the end, the emphasis placed on relationships in the digital stories seemed to set the tone for the rest of the activities conducted in ConvoClub, as the girls kept coming back to this topic, wishing to explore relationship-themed activities further. We suggest that this focus on relationships

**Table 3.2** Digital storytelling title and topic

Name	Title	Subject
Shanice	When I turned 16...	Shanice's experience with an abusive ex-boyfriend
Karen	"Siblings share childhood memories and grown-up dreams"	Karen's relationship with her younger brother who was born prematurely
Caleigh	[Brother's name]	Caleigh's brother's involvement with drugs and subsequent incarceration, and her evolving relationship with him
Sarah	The Beatles is our connection	Sarah's relationship with her mother and step-family
Sharon	My story	Sharon's relationship to her own body, self-esteem and a relationship with a boy from summer camp
Kelly	It all started like this	Childhood medical trauma and its impact on Kelly's life

provided the girls with opportunities to co-construct "bonding capital" (Nasir & de Royston, 2013), which created solidarity among the group members. Bonding capital in this case emerged as a desire and willingness to "dig deep" and engage in storytelling about relationships given that kind of talk had currency within this group. We found many instances of bonding occurring alongside science conversations during the ConvoClub activities.

Video data from the storytelling circle (during Week 2) contains several examples of instances where group members cried in solidarity with the storyteller, got up to hug them, or whisper "We love you" in supportive ways (FN-022411).

Darlene, the group leader, described the digital storytelling activity in the following way:

To have them open up and they finally did, it was a beautiful thing...it took a lot of strength from a lot of them, a lot of courage to speak on certain things and to open themselves up. You know, so was- 'cuz to talk about themselves is very, very hard, and they went through it, they did it, and finally, and it was emotional, and I think it brought the group together. (INT 1)

At no time did the youth discuss science during these activities, nor did the researchers raise science topics. However, the bonding capital that developed through digital storytelling eventually shaped the science conversations that emerged in the subsequent meetings. The theme of "relationships" was so salient to the group identity that it framed the "science in my life" collage activity, and subsequently influenced the themes the youth wished to explore when planning the documentary. We see the bonding capital emerging in these activities as forming the foundations for a "thick place" (Duff, 2010) that facilitated place-making work. Duff (2010) argues that thick places are made through the *affective force* of practices that are given meaning while presenting opportunities for personal enrichment. Thick places enhance one's sense of belonging thereby "forging a series of affective and experiential connections in place" (Duff, 2010, p. 882). In this sense, place-making happens through affect and practice. The bonding practices we observed in ConvoClub generated a sense of meaning and belonging, by providing opportunities for the girls to share

affective experiences that drive their connections within and to the space of the ConvoClub. Duff (2010) argues that thick places can structure young people’s experiences of self and belonging through an “intensification of the affective pull of place” (p. 882), and thick places can provide resources for young people to facilitate personal enrichment, nurture ambitions and help to realize their own capacities. We argue that the bonding capital emerging from the digital storytelling activities facilitated the formation of a thick place in which the girls could push and pull on each other to “go deep” and share aspects of their lives that they struggled deeply with. Membership in this group required the girls to be emotionally vulnerable with each other, but also supportive. Many of these girls expressed feelings that they were “not good” in science, and strong feelings of alienation from the discursive and material practices of classroom science (e.g., Gonsalves et al., 2013). When we approached them initially with the possibility to engage in a science club, the girls showed very little interest in participating. However, as the group evolved into a place with affective pull, they showed increasing interest in having conversations about science, if they could relate those science conversations back to meaningful topics in their lives. In this way, they established a temporally and spatially located membership in a science group.

### ***3.4.2 Co-Opting Science to Advance the Goals of ConvoClub***

The foundations for co-opting science to advance the goals of ConvoClub were formed in the digital storytelling activity and persisted through the subsequent activities. The affective pull of the private space of ConvoClub was established through “going deep” in the digital storytelling activity, which seemed to influence the goals the youth had for the science activities. We discuss the following activities as co-opting science to advance these goals, but we do not mean to frame co-opting in a negative sense. Rather, we suggest that talking about science in a thick place provided possibilities for the girls to momentarily construct inside-ness in relation to STEM. Talking science into their lives (e.g., via “relationships”) became a pivotal point around which the girls explored the affective dimensions of this thick place and could signal their belonging to ConvoClub. Thus, rather than a science learning community forming the basis of girls’ engagement with each other, the girls’ place-making and bonding were in focus, and these touched on science in meaningful ways, supporting the girls’ identity work.

This orientation to ConvoClub was galvanized in the collaging activity and the mini-documentary planning meetings. These activities provided many opportunities for science conversations that were usually co-opted by the girls’ preferences for talking about issues deeply connected with performances of ‘popular’ or ‘girly-girl’ forms of femininity, with an emphasis on boys, sex, beauty, and relationships (Read et al., 2011). Femininity in this group was closely connected to compulsory heterosexuality (Rich, 1980), although conversations about same-sex relationships did occasionally occur, with assurances from the girls that “you guys aren’t

homophobes, right?” (FN 021011). Since relationships were generally assumed to be heterosexual, much of the talk in the group focussed on boys and sex. Data from this activity demonstrates instances when girls attempted to connect with science through performances of hetero-femininity. The following conversation, recorded during one of the planning meetings for the mini-documentary, details conversational evidence of youths’ attempts in reconciling their investment in hetero-femininity with science.

Karen: Is love science?

Sharon: Yes.

[Other girls say on the back: “Yes!” “Yes!”]

Darlene: Lord have mercy. That’s ok, Karen. That’s ok, sweetie.

Karen: That could be science.

Darlene: That’s ok. That’s the male body.

Volunteer: How do you... How do you know you love someone?

Darlene: How you feel inside.

Kelly: Yeah.

Volunteer: Do you feel different physically at all?

Darlene: The chemicals in your body.

Kelly: Yes.

Darlene: The hormones. (TRANS4040711)

To connect the “male body” with love and feelings, caused by “chemicals in your body” and “hormones” is an example of the form co-opting of science took in the club. Evidence of such work can also be found in the collage activity. The girls created poster boards themed around “What science means to me”. Each of the girls’ collages was unique in that it was also themed around issues that were of interest to them, as shown in Table 3.3.

**Table 3.3** Collage topics and descriptions

Name	Theme	Content
Shanice	Science of beauty and relationships	Numerous images of bodies, cosmetics, and various images of heterosexual “love” inspired by a course she took on sexuality and relationships
Karen	Justin Bieber and science (music)	Numerous images of Justin Bieber and references to music, along with “scientific placeholders” (Gonsalves et al., 2013) like the formula for Boyle’s law
Caleigh	Science of relationships	Images that represent friendships because you have to “click” with someone so you can become friends. The click requires chemistry, which explained images depicting chemistry
Sarah	Glee and communication technology	Images of the TV show Glee because “music is science”. Also included images of cellphones because “cellphones are also science”
Sharon	Science is making mistakes	People make mistakes; used images of words themed around love and change
Kelly	Toxic relationship	Poem about a relationship that ended; uses words like “chemicals”, “exploded” and “poison” to connect with science

The collage activity was intended to explore how science is situated in the girls' everyday lives, but the girls co-opted this activity to instead collage themes related to popular culture, beauty, and relationships. These performances on paper (the collages) can be read as the kind of ‘cool girl’ performances described by Dawson et al. (2019): they describe the manner the working-class girls’ performances of hetero-femininity in museums drew on resources from youth culture rather than the resources available in the science museum. Like Dawson et al. (2019) we found that the girls in this setting also combined these performances of hetero-femininity with classed performances of being loud, funny and dismissing school and especially school-based science. The collaging activity made evident the girls’ desires to draw on their own resources (e.g., cellphones, friends, music, cosmetics) to build bonding capital in the group, rather than drawing on the material and human resources available in ConvoClub (e.g., science-related magazines and texts, activities and conversations). As described previously (Gonsalves et al., 2013), these girls had all previously indicated disengagement from school science, and little interest in science beyond the occasional fun science activity at summer camps or other occasional programs at the Centre. Many of the girls expressed negative experiences with science in school, and feelings that science was not relevant to their lives or topics that they were invested in. However, talk in the ConvoClub that repositioned some of their interests as science-related resulted in the refiguring of some of their own ambitions for participating in the group. Framing their expressions of femininity as related to science, caused them to demonstrate an interest in pursuing these conversations.

Following Dawson et al. (2019) we argue that these performances of “cool girl” hetero-femininity provide opportunities for the girls to perform insider identities in the ConvoClub, and suggest that the collage activity in particular illustrates the challenges the girls face in assuming an identity as insiders to science. It can be read as an agentic act of pushing back on canonical science and in that sense, Convoclub offered them an opportunity to play with a form of science that lend itself to be co-opted with their lives and current challenges tied to relationships and love. The co-opting looked different across the girls in that Sarah and Karen for instance, make attempts to illustrate scientific interests or concepts in their collages (e.g., direct references to science-related content), while others like Shanice, Caleigh and especially Kelly make only cursory references to scientific placeholders (a molecule). Instead, they discuss how science words emerge in their persistent interests. All references to ‘science’ are couched in language that the girls encounter in school like “wires and resistors” (for a discussion, see Gonsalves et al., 2013), which they consider as the kind of science that has capital, yet not in their own lives as girls on the margins of Western science, and specifically, school science.

### 3.4.3 *Positioning Selves as Science Experts in the Club*

The mini-documentary making was an activity designed by the girls in ConvoClub to expose the other youth in the community centre to science topics that had relevance to their everyday lives. Through this activity, the girls in ConvoClub took on the roles of science experts in the CC Centre. They conducted “streeters” (video-recorded on-the-spot interviews) with the other youth, volunteers and coordinators at the centre, and chose the clips to include in the final product. To choose which clips to include in the documentary, we thematized the interviews. As the girls embarked on their documentary project, particularly their engagement in streeters (a journalistic practice wherein they stopped other youth in the centre and quizzed them about their knowledge of science and whether they knew they “did science every day?”), we noticed that they began to position themselves as insiders to science in relation to the boys in the club. Our observations of the girls interviewing the boys in the community centre raised questions for us about whether they were accumulating a locally valuable form of science capital (e.g., Archer et al., 2015). Their focus on science as tied to their lives suggests the girls noticed that it had local power. The girls seemed to invest significant emotional energy in this activity (e.g., Gonsalves, 2014) as it provided opportunities to engage in scientific knowledge in new and meaningful ways, but also to position themselves in relation to boys that were powerful for them in the context of the club. Girls were enabled to enact identities as insiders-to-science through this documentary activity in ways that afforded them capital in the space of the club. In this way, the club provided them opportunities to test out identities as science-savvy people (in relation to the boys), which is something they seemed to play with and enjoy. For example, the following discussion happened during the editing process when we tried to identify a common theme among the streeters’:

Allison: Most people [interviewed by the girls] think science is boring, most people... don’t know that they do science in their everyday lives. So, did you wanna keep all those little clips, where people say “I don’t know”, “I really have no idea”...

Sharon: I think so.

Shanice: I think it’s a bit true.

Sharon: Yeah.

Sarah: The truth.

Shanice: I don’t think people actually think about using science every day. Like you go to school ‘cuz they’re supposed to teach you that there’s science all the time, and blah blah blah.

Shanice: But nobody remembers science at school.

Sharon: Unless you have to sit and think about it. ‘Cuz even when you asked us, we were like “Oh...”.

Allison: Yeah. I know. It is kind of a difficult question to just bring on people.

Sharon: That’s why [Bear] said he felt stupid. (TRANS042811).

Despite the outputs from the collaging activity that were largely disconnected from science, the mini-documentary making afforded the girls opportunities to position themselves as insiders to science, particularly as knowledgeable about how we engage in science in our everyday lives. We argue that this facilitated a chance for girls to accrue a locally valuable form of science capital. An example of how the girls positioned themselves in relation to others in the club can be seen in video data collected at the time of the documentary editing:

Allison: What do all of these interviews tell you about what people think about science?

Shanice: They think that science is boring, and they don't know very much about science.

Allison: OK.

Shanice: That's what I got, anyway.

Caleigh: I know, eh?

Sharon: There's not one definition of science.

Kelly: People don't know very much.

Sharon: What science means to one person is not necessarily what it means for the other. (TRANS042811).

We found that within the space of ConvoClub youth valued not just knowledge about science, attitudes or exposure to science—all key dimensions of *science capital*—but specifically the ability to talk about science with others in the club, and the ability to connect everyday engagement with science and the persistent interests of the youth in the club. Thus, we suggest that some dimensions of science capital (related to talking about science and connecting science to their lives) can be valued highly and exchanged locally for recognition as insiders-to-science (Carlone & Johnson, 2007; Gee, 2011) in the context of the club. However, we caution that the local accrual of science capital in this form, does not seem to have exchange value outside of the club, or at least, the youth do not see its exchange value. Interviews with the girls in interviews after the activities were completed revealed their persistent positioning as outsiders-to-science. Many of the girls articulated that the kinds of science conversations we had in ConvoClub did not correspond with aspects of school science which they interpreted as “real science” (Kelly, INT 1). Additionally, despite positioning themselves as insiders-to-science in the context of the ConvoClub, follow-up interview data saw the girls persistently positioning femininity in opposition to school science. To illustrate, the following exchange provides an answer frequently given by the girls in interviews in response to questions about who does science.

Allison: Do you think that most girls are interested in science?

Caleigh: Probably not.

Allison: Why not, do you think?

Caleigh: 'Cuz they're more interested in like their hair, and like their makeup, and like being popular, 'cuz like science doesn't necessarily go with being popular, being like in the cool clique, so girls like being in the cool clique.



Allison: Do you think that's more normal for boys to do science than girls?

Caleigh: Ah. Probably. I think maybe yeah. 'Cuz girls are more like I think we're more like: we don't wanna like get our nails ruined, or we don't wanna like get something on our clothes, or like we don't want this chemical doing something with my hair, or like if it's humid and you don't iron them, they'll be puffy, like guys are just "I don't care", do whatever you do. (XX)

In this excerpt, Caleigh reifies the notion that femininity is incompatible with science (Francis et al., 2017; Gonsalves, 2014). Her statement that girls are interested in hair and makeup leads directly to the assumption that they would thus not be interested in science. Caleigh herself later on suggests that she is still not interested in school science, despite her interest and engagement in the science conversations at ConvoClub. This suggests that although the performances of gender in ConvoClub aligned with forms of science capital valued in the context of the OST space, the girls themselves did not see the exchange value for these outside the club. We suggest that the forms of capital generated in the club, were only locally valued and did not have any significant exchange value outside of the club. They could be exchanged for insider status among the girls, and generated insider-ness at the club, but they did not seem to create any notable shifts in the way the girls talked about school science or science outside of the club context, or their future aspirations in science. We did not spend a significant amount of time explicitly discussing the gendering of science with the girls in ConvoClub. In retrospect, more explicit conversations about the under-representation of women in science (e.g., Hazari et al., 2013), and the gendering of scientific knowledge may have contributed greatly to the girls' reflections on their own positionality in relation to science.

### 3.5 Discussion

In this study, we saw the girls' engagement in the ConvoClub activities evolving over time, with increasing identification towards science, as evident in attempts to reconcile their engagement in science conversations with their performances of popular femininity (Read et al., 2011). Rather than seeing this as a constraint, we regard this an innovative way to accrue a local form of science capital (Archer et al., 2015) in the space of the ConvoClub, where an investment in performances of popular femininity have currency. This suggests that the concept of science capital can have local value, as a form of currency that girls exchange for momentary recognition as insiders-to-science (Carlone & Johnson, 2007). Hence, activities and conversations about science may contribute to youths' "holdall" of science capital (DeWitt et al., 2016) in ways that are more congruent with their investment in popular forms of femininity, and as such may offer a 'way in' to engage girls over time and possibly across practices, in science learning. In this sense, we do not see girls' engagement in science talk in the ConvoClub as contributing to their accumulation of science capital that will have significant exchange value outside of the club; nor do

we imagine that girls gain science capital in the forms it has been previously conceptualized (e.g., Archer et al., 2015; Archer & DeWitt, 2017). The forms of science participation that emerge in ConvoClub may be better understood as examples of non-dominant science capital (e.g., Carter, 2003). Others have argued that cultural capital has been conflated with dominant cultural practices, and biases towards White, middle-class cultural productions that ignores the cultural capital of non-dominant groups (Carter, 2003; Ehret & Hollett, 2016; Yosso, 2005). Carter (2003) suggests that we may be served by understanding various forms of dominant and non-dominant cultural capital, where non-dominant forms of cultural capital are typically undervalued in educational spaces.

We find it important to stress that the girls in the ConvoClub demonstrated aspects of science capital that were specific to their community and thus valued locally (Yosso, 2005). However, the girls themselves were well aware that their locally valued productions of science capital would not yield any exchange value outside of the CCC space. We suggest that this was not the goal of ConvoClub, and that the girls’ investments in their own bonding and place making via the ConvoClub was of greater value to them than the possibilities to yield science capital with exchange-value. As we reflect back on the girls’ agency in the group and their actions of co-opting science to advance the goals of ConvoClub, we recognize that bonding and support was the primary activity of the club, and that this led to brief encounters with science, rather than the other way around. As researchers, we were first concerned to provide high quality science experiences in the context of the ConvoClub, but instead what emerged was the possibility for the emergence of a “thick space” (Duff, 2010) for youth engagement. The thick space that comprised the ConvoClub was grounded in the girls’ performances of popular femininity (e.g., Read et al., 2011), which in some ways they still regarded as incompatible with science. However, these performances were meaningful to them, and the local productions of science capital that emerged in tandem with these gender performances created fleeting opportunities for the girls to see themselves as insiders to science. Perhaps more importantly in this context, though, was the affective placemaking (Ehret and Hollett 2016) the girls engaged in. Placemaking has been associated with young people’s positive development, sense of agency and position and purpose in community life (Duff, 2010). Placemaking has also been described as an affective practice that creates a sense of belonging, but also an “action-potential” wherein agency can be enacted. Reflecting back on ConvoClub, we realize that while we thought the girls’ investments in “relationships” was initially a distraction from science, it actually created the possibility for a “thick place” and set the groundwork for the possibility of learning. While we did not observe any long-lasting identity shifts for the participating girls in relation to science, we argue that further opportunities to engage with the girls in ways that emphasized bonding and group membership might allow for these. The study was limited by the time in which we could engage with the girls. Had we more time to develop science conversations about femininity and the under-representation of women and girls in STEM disciplines, we may have further developed possibilities to contribute to their identity-work in relation to science. We argue here that the placemaking work we engaged in was not

insignificant for the girls' experiences with science. By approaching our project with a clear goal to prioritize relationship-building over science learning, we created the possibilities to develop an "affective pull" even when engaging in conversations about science.

These findings have consequences for how we think about girls' identity performances in relation to science. We found that through the affective work of bonding and through their multi-modal expressions of self in relation to science, the girls created a thick space for themselves to engage in identity work around science on their own terms. While they managed to position themselves as insiders to science in this context, they may encounter struggles to be recognized as science insiders outside of the ConvoClub. In schools and in their everyday lives, youth, especially girls, are likely to encounter meaningful others (teachers, instructors, family members, friends) who don't recognize girls' resources as valid contributions to science (e.g., Wade-Jaimes & Schwartz, 2019), or their identity performances as congruent with science (e.g., Francis et al., 2017). Therefore, broadening what we consider to be identity work in relation to science, and attending to the affective dimensions of this might also help to support not only youth's science learning, but also their continued identification with science.

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