"I come from a poor family": deciphering how working-class young men aspire to and experience their journeys in STEM higher education

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Abstract

Working-class young men are often pathologised for their perceived lack of white-collar career aspirations. Historically, and in our present context, only a select minority of working-class males pursue higher education. Of those who attend, few choose to study STEM, which is often associated with academic rigour, competition and prestige. As a result, we know little about the motivations and experiences of working-class men pursuing STEM degrees. The aim of this paper is to decipher some of the complex interweaving of masculinities, social class and learner identities in STEM through focusing on three key themes from a longitudinal study focused on first-in-family males: (1) desire for financial stability and fulfilment; (2) internalising pressure; (3) struggles with social acclimatisation to university. The research provides some insight into how we can better support males from non-traditional backgrounds who aspire to pathways that contrast greatly with their socio-economic background.

Keywords Widening participation · Higher education · STEM masculinities · Working-class masculinities · Gendered aspirations

Introduction

Historically, the study of science has been largely dominated by men from privileged backgrounds and continues to carry a connotation of exclusivity and elitism. As a result, masculinist notions of science continue to permeate popular culture where male scientists are portrayed as assertive 'men of action' (Milam & Nye, 2015, p. 5;

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Scholes & Stahl, 2020) or as the lone, socially awkward science geek (Archer et al., 2014; Carlone et al., 2015). These gendered discourses lead to confusion and reduce opportunities to widen participation within the science, technology, engineering and mathematics (STEM field). Furthermore, given their dominance, such discourses are often 'used as the marker against which other masculinities are measured' (Pease, 2000, p. 32). As we seek to advance equity in STEM participation, the experiences of men from working-class and minority backgrounds have received limited attention (with the exception of Beutel et al., 2019; Danielsson et al., 2019; Pelch, 2022; VanMeter-Adams et al., 2014). In Australia, large-scale research suggests that men from disadvantaged backgrounds are the least likely demographic to attend university, no less enter the sciences (see Lamb et al., 2020). Furthermore, there is a high rate of attrition for the select few that do attend (Stahl, 2022).

The research presented in this article is informed by a growing interest in the ways in which socio-economic status continues to exert a substantial influence upon the realisation of student aspirations (Austin et al., 2020; Berger et al., 2020; Gore et al., 2015a, 2015b). A working-class background is typically associated with a generational history of manual labour, vocational trades, or low-skilled jobs where limited financial resources may contribute to various challenges compared to students from higher socioeconomic classes. Fundamental to our analysis is how social class often influences many aspects of our lives such as opportunities, experiences and perspectives concerning one's education. Furthermore, class is often a significant structuring force in the formation and maintenance of aspirations (Baxter, 2017).

In our current neo-liberal times, the policy agendas often frame young people from disadvantaged backgrounds as having a 'poverty of aspirations' (McInch, 2022; Spohrer et al., 2018). Interwoven with this framing has been what is called a 'raising aspirations' agenda which is innately problematic (Stahl, 2017) given the over-emphasis on the individual, where there is little questioning of systemic and institutional inequities that contribute to the status quo nor what resources working-class young people are able to access. In exploring working-class males pursuing STEM in higher education, we are interested in what happens when *aspirations are raised* and what may be involved in reifying these aspirations. Aspirations do not happen in a vacuum and require careful maintenance; furthermore, there is often certain pressures attached to them (Apps et al., 2022; Grant, 2017).

This article reports on a subsection of data from *The First-in-Family Males Project*—specifically those cis-gender males from working-class backgrounds pursuing STEM degrees. In exploring how these young men from non-traditional backgrounds experience higher education, we focus on how their aspirations are realised in relation to their wider lifeworlds and how their aspirations require specific identity resources in order to ensure their success (see Archer et al., 2014; Burke, 2009; Scholes, 2018; Danielsson et al., 2019). First-in-family students are commonly defined as 'no one in the immediate family of origin, including siblings or parents, having previously attended a higher education institution or having completed a university degree' (O'Shea et al., 2017, p. vii), though this definition is, of course, subject to contestation. Having no one in their immediate family often places first-in-family students at a disadvantage in navigating higher education (Stahl, 2022; 2022). Often, these young men face limited access to various capitals, which, at

times, hinder their understanding of STEM-related career possibilities. As a result, they often remain unsure about their future career pathways after university (Rosa, 2018; 2022). We cannot treat young men pursuing higher education as a homogenous group and our analysis seeks to nuance how males experience higher education (Harris & Harper, 2015; Laker & Davis, 2011). Foregrounding the importance of considering the production of masculine subjectivities with regards to intersectional identity factors, Pease (2000) astutely notes, 'a large number of men benefit from the patriarchy, they do not all benefit equally' (p. 32). This is particularly true for men from disadvantaged backgrounds.

A significant challenge for those seeking to become socially mobile is a reformulation of emotional, social and spatial attachments (see Jaremus et al., 2023; Pimlott-Wilson, 2015). In reflecting on the identities of men who become socially mobile, Tolson's (1977) seminal work notes that 'as [working-class males] move between the demarcated spheres of his existence, a man must negotiate barriers of definition and find ways of coping with the shifting of his identity' (p. 13). There is a need to think about how the aspirations and identity work of young men are informed by societal discourses, discursive framings and where they are engaged in complex identity work (Davies, 1989; Stahl et al., 2024), influencing the subjectivities they present. As individuals, they are constituted through a variety of gendered discursive practices (Paechter, 2006), and, as Pease (2000) writes, men 'reconstitute themselves through a self-conscious and critically reflective practice' (p. 35). We are interested in how males from working-class backgrounds *constitute* and *reconstitute* themselves in their pursuit of higher education. To deepen our analysis, we consider how the working-class experience is shaped by 'a propensity to accept exclusion or exclude oneself rather than attempt to achieve what is already denied' as identities are 'the products of opportunities and constraints framing the individual's earlier life experiences' (Reay et al., 2005, p. 24). Or, as Johnson and Lawler (2005) write, 'social-structural dimensions of class inequality are now understood as being embedded only in the subjectivities of social actors' (1.4). When considered through this lens, both identities and aspirations are, we would argue, fragile projects of the self.

The research presented in this paper documents the formation and maintenance of aspirations of a small but diverse cohort of young Australian men as they *aspired to* and *engaged in* studying STEM disciplines at university and the pressures they experienced. We are interested in what Archer et al., (2014, p. 1) describe as 'discursive performances of masculinity' in the production of STEM masculinities. In foregrounding the accounts of these young men, we decipher some of the complexities involved with how masculine subjectivities are produced in relation to social class, which, in turn, influence learner identities.

The article is constructed in five parts. First, we provide a brief overview of research informed by social theory on the relationship between masculinities, the pursuit of higher education and gendered subjectivities. Second, we discuss how masculinities, learner identities and occupational aspirations influence the choice of studying STEM. The third section presents the longitudinal research methodology, which allowed us to focus on the participants' transitions from secondary school to higher education. In the fourth section, we draw on our thematic coding to present

three key areas contributing to the subjectivities of these young men. Finally, the paper concludes with a discussion and conclusion where we highlight the social justice implications regarding research on men from working-class backgrounds studying STEM at university.

Theorising gendered and classed learner identities and aspirations for STEM

Masculinities and gendered learner identities are produced through educational contexts which contribute to the formation and maintenance of aspirations. Schooling:

> Provides contexts through which students' identities are constructed, refined, resisted, and altered [where] attention must be paid to the ways in which certain subjects, in this case, provide resources for, or erect barriers to, students' construction of subjectivities, or identities. (Letts, 1999, p. 106)

In considering barriers to equity in the sciences, research continues to highlight access to 'science capital'[1] (Archer et. al., 2015), masculinist traditions and the privileging of certain gendered identities that contribute to maintaining inequality (see Archer et al., 2014; Archer et al., 2016; Calabrese Barton et al., 2013). Building on this, recent research suggests the perception of science as a masculine subject still appears to have significant implications for how young men may come to see themselves as science students or scientists (Archer et al., 2016; Danielson, 2012; Gonsalves, 2014).

Self-perception is integral to the formation and maintenance of learner identities and a longstanding strong predictor of academic achievement (Jones & Grieneeks, 1970) and STEM identities (Talafian et al., 2019). For example, in the study of masculinities in secondary mathematics classrooms, Mendick (2006) documents how mathematics becomes 'part of each student's gender identity project' (p. 70) where performances of gender are aligned with the curriculum, each mutually informing. Therefore, in terms of how we understand the production of a science masculinity, it is composed of how students come to perceive themselves as certain types of learners, closely aligned not only with the science disciplines they engage with (Mendick, 2006; Scholes & Stahl, 2020), but also wider societal discourses.

Archer et al. (2015) writes how 'science capital' plays a mediating role in relation to young people's aspirations. When considering the production of masculinities and what this may mean for the formation and maintenance of aspirations, we acknowledge societal influences upon gender roles and norms, which happen long before students enter secondary school. For example, research from the Longitudinal Study of Australian Children annual statistical report reflects the gendered nature of the Australian labour market, reporting boys showed preferences for jobs in engineering and transport, Information Technology (IT), technical or trade work, and sports-related industries. In contrast, the majority of girls in the same age bracket aspired to five main professional areas: education professionals, legal or social professionals, beauty therapists, nursing, veterinary work, arts and media. This large-scale data echoes the findings from The Australian Institute for Family Studies, which

highlighted how, during adolescence, boys and girls often display highly gendered occupational aspirations, tending towards 'gender traditional' occupations (Baxter, 2017). Compared to girls, Baxter (2017) found that boys were more likely to confidently know the occupation they want to pursue. For children from working-class families, the top occupations included construction, engineering and transport for boys, and personal service, nursing and health and welfare support care for girls. This suggests not only the salience of societal discourses regarding gender, but also how class contributes to the formation of working-class young people's aspirations (Scholes & McDonald, 2022). Furthermore, in terms of socio-economic status, Baxter (2017) highlights that adolescents from lower socio-economic families were more certain in terms of their career paths than their higher socio-economic equivalents, though students from higher socio-economic families tended to have higher occupational aspirations (see also Gemici et al., 2014).

In this article, we adopt a post-structuralist perspective where masculinities and femininities, as discursive practices, are not fixed. As masculinities and femininities constantly evolve, their influence on how learner identities are performed ebbs and flows (Paechter, 2006; Stahl et al., 2024). In formal school contexts, learner identity(ies).

> Refer specifically to the conceptualizations children have of themselves as learners, but as with social identities, these are relational and pupils construct themselves and are constructed by others as particular types of learners in relation to both other pupils and their teachers. (Reay, 2010, p. 279)

In studying the experience of males pursuing STEM degrees, we are interested in 'how boys "do boy", and the implications of their performances for their ease or difficulty in a science trajectory' (Carlone et al., 2015, p. 440; see also Archer et al., 2016). Therefore, foundational to how we think about masculinities in STEM is how learner identities are composed of multiple competing performances, which are often discipline and context-specific (Lee, 1997).

Raising aspirations and the working-class student experience

Efforts to widen participation are often in tension with the neoliberal agenda. As we are all cast as neoliberal subjects, responsible for self-authoring our fate, we are compelled to produce subjectivities that carry a certain worth (Davies & Bansel, 2007). For students from disadvantaged backgrounds, the effects of neoliberalism can lead to difficult identity negotiations (Archer et al., 2010a). For example, while neoliberalism promotes self-crafting in a world of infinite possibilities, research suggests working-class males restrict their occupational aspirations to fit conventional narratives of masculinity tied closely to their primary socialisation and their immediate locale (Nayak, 2006; Noble, 2009). These powerful socialisation processes contribute to struggles to dissociate themselves from their background, where aspiring beyond their current circumstances carries with it certain identity risks (Stahl, 2012). Therefore, many working-class young men are mitigating the risks of 'aspiration anxieties' and finding ways to keep their career options open (Wallace, 2017).

Unlike their middle-class peers, who often aspire highly and invest heavily in positioning themselves for their futures, working-class males often realise their aspirations in relation to their immediate needs and feeling a sense of financial responsibilities towards their families (Spohrer et al., 2018; Stahl, 2022). With far fewer enablers and considerably more constraints, working-class males often have difficulty believing in their 'right to aspire to accomplish' (Sparks, 2018) and to obtain those occupations associated with high status. To be clear, this does not necessarily mean they are not active learners as there continues to be misalignment between working-class male engagement in education and their desire to learn (Asplund, 2021).

In Australia today, students are encouraged to aspire for university attendance, which is commonly portrayed as a superior option compared to other pathways, such as vocational education or direct entry into the workforce (Jaremus et al., 2023). However, the rhetoric often contrasts starkly with reality. Many students attending disadvantaged schools may face notable challenges in accessing good STEM education, such as the limited specialised trained teachers and often non-existent classroom facilities (Lyons & Quinn, 2015; Puslednik & Brennan, 2020, p. 3; Stahl, 2021). There is a clear tension between what is expected and the opportunities they can access. This tension exists alongside experiences with pathologisation in their secondary education especially for those young men who do not aspire to university (Stahl, 2022) as well as the increased expense of studying, especially for in-demand technical degrees, and the weight of knowing that a HECS debt will need to be paid back in the future. As young men move through their formal education, they are often cast as 'heroes' or 'zeroes' depending on their aspirations and academic engagement (see Francis, 2006).

Masculinities, higher education and gendered subjectivities

Research on masculinities in higher education has often focused on four key areas: (1) forms of hegemonic masculinity (e.g. competitiveness, emotional detachment) are often reinforced through common institutional practices; (2) men who do not conform to traditional masculine norms may face marginalisation and discrimination in higher education; (3) a focus on querying intersectional identity factors shaping men's experiences and (4) a growing emphasis on engaging men in conversations about gender and promoting healthier forms of masculinity and how best to do this. A fifth possible strand of this field is how, within the last decade, research has highlighted the need for universities to be both aware and more sensitive to the needs of men (Davis & Barone, 2019; Harris & Harper, 2015; Laker & Davis, 2011; Stahl, 2022).

In their study of men's transition to higher education and their discipline-specific experiences, Bowman and Filar (2018) call attention to how men's 'achievement and success' are influenced by 'a variety of campus choices, including the selection of academic major, willingness to participate in service, and differential attitudes toward coursework across the curriculum depending upon perceptions of transferability toward future goals' (p. 3). Arguably, these experiences are also informed

by their lives outside the classroom, both prior to attending university and during their studies. It is in reference to their experiences that masculine subjectivities are produced. In reflecting on the construction of masculine subjectivities in higher education, Burke (2009) writes that, as a concept, it 'helps to understand the ways that individual men construct their identities as situated subjects within complex social and cultural networks and sites, such as schools and colleges' (p. 84). As masculine subjectivities are produced, they are also performed. For example, a continual theme in the scholarship has been documenting how males in higher education can often adopt an 'easy-going' attitude to counteract some of the academic stresses (Burke, 2009; Nichols & Stahl, 2017).

For men whose identities comprise intersecting identity categories, some identities may be prioritised over others depending on circumstance, contributing to how masculine subjectivities are 'a process involving constant negotiation of multiple subjectivities, or fragments thereof, in which men have unequal investments' (Pease, 2000). Clearly, masculinities are always 'classed' and 'racialised' (see Archer, 2003), but a diversity of masculinities are enacted and performed within these categories. As young men shift from their secondary schools into university study and the labour force, their subjectivities often undergo change. Or, as Connell (2005) explains, the period of adolescence for young men may be 'understood as a period in which the embodiment of masculinity takes new forms and moves towards adult patterns' (p. 15). Our research seeks to capture the shifting subjectivities working-class men present as they pursue STEM degrees.

Research methodology

Context and methods

This article draws on a small segment of data from *The First-in-Family Males Project* (n = 42), which focuses on the aspirations of working-class young men living in high poverty peri-urban areas across two Australian states. We focus on the 14 young men who chose to study STEM at university (approximately a fourth of the cohort). While some of the themes we highlight were reflected in the wider data set, these themes were more pronounced with this subsection of participants. The overall research project was multifaceted, where we mapped the aspirations of the young men in terms of their education and future employment often in relation to their values and motivations and their interests and hobbies as well as their peers, romantic relationships and familial responsibilities (Stahl, 2021, Stahl 2021a, b, 2022). Our overall aim was to capture how their lifeworlds informed their aspirations longitudinally (Stahl & McDonald, 2019). We consider the diversity of discursive spaces young men come to inhabit but also what access to these spaces means for the construction and maintenance of their subjectivities and aspirations (Alexander, 2019; Nichols & Stahl, 2017).

In terms of *The First-in-Family Males Project* cohort, all the participants attended disadvantaged schools in post-industrial peri-urban areas where only a minority of the population attended university according to the Australian Bureau of

Statistics. In terms of the young men's knowledge of what a STEM career entailed, it was largely fragmented. When asked about their motivation for choosing a science degree at universities, we found that none of the working-class young men except one (Levi) knew someone working in STEM. Thus, in surveying the data, it appeared the participants' aspirations around pursuing science at university was primarily shaped by their learning experiences at secondary school, the influence of their teachers, and their extracurricular activities (e.g., field trips, etc.).

Data collection and analysis procedures

After ethics permission was secured from the university, the state education sector and the Catholic education sector, we met up with the participants every 6 months over three-years, roughly from the age of 17 to 20. The primary data collection procedure was semi-structured interviews, which often went for longer than we had anticipated, suggesting a willingness of the participants to talk at length about their experience. The success of the interviews can be attributed to several factors. Firstly, we adopted a non-authoritative approach and maintained a friendly demeanour throughout. Additionally, we made a concerted effort to listen attentively without interrupting. We did not have access to the interviewees' academic records, and we did not ask them directly about their academic performance. Therefore, our analysis is based solely on what the participants were willing to disclose during the interviews.

During the data analysis process, a professional transcription company was used. Once the interviews were transcribed, we listened (and re-listened) to the audio files several times and checked them against transcripts to ensure accuracy. Braun and Clarke (2006) contend that the process of analysis is more active, where the researcher(s) contributes significantly to identifying patterns/themes, selecting those which are of interest, and reporting them to the readers. The point here is that, as a research team, we engaged in discussion over the course of the data analysis, developing (and re-developing) the themes for interpreting working-class men's learning experiences associated with their identities in STEM higher education. Boyatzis (1998) refers to this as data analysis at the semantic or explicit level, or at a latent or interpretative level.

Findings

In reporting on these interviews with young men from working-class backgrounds who aspired to STEM careers, we foreground their accounts in an effort to capture some of the aspects of the formation and maintenance of their aspirations. We do not delve deeply into their views on the science culture at university, though they do note it was male-dominated. Dominic, who was studying engineering, said that his foundation was framed by a gender imbalance with 'about 15 girls out of, like, the 150 students, I think.' Manny, who was in the same course, described it as 'it's just a dude fest.'

In terms of their self-perception of their STEM skills, the participants largely described themselves in favourable terms. For example, Dominic's experience with maths served as an entry point into understanding where he could excel, 'when I first started to love maths was in primary school, second year I'm pretty sure. I was the best in class, so that kind of inspired me to do—keep going better, see how far I could go, but besides that, not really anyone else.' Meanwhile, Logan, who was admitted to studying biological science, described how he was inspired by David Attenborough and Marie Curie, portraying himself as 'I am a science kind of nerd,' suggesting a comfortability with a 'geek' identity. While this high self-perception did contribute to their resilience, several of the young men described themselves as confused by the structure of the course which did not always reward their strengths. Logan felt underprepared because in Year 11, he chose biology rather than physics and chemistry.[2] Furthermore, as Logan progressed in his course, he said, 'I thought I would be in the microbiology sciences and the molecular biological sciences. Didn't do as well as I thought I would, but I excelled in the animal sciences and the wildlife sciences. And so the … didn't do as well as I thought I would in the other sciences.' Logan eventually decided to drop one of these courses and restart the following year. The main point is that, when surveying the section of the cohort studying STEM, many of the young men entered into a period of struggle in the pursuit of their degrees. While many students struggle to transition to university life, we know students from disadvantaged backgrounds often have additional barriers (e.g. transportation, inadequate preparation, financial constraints, etc.). With this in mind, we are interested in documenting the motivations and experiences of working-class young men pursuing degrees in STEM, highlighting the influence of gender and social class on their journeys (Table 1).

In exploring the subjectivities of working-class men, we decipher their identity work as composed of three main areas drawing from our thematic analysis of the qualitative data: (1) desire for financial stability and fulfilment; (2) internalizing pressure; (3) struggles with social acclimatization to university (see Fig. 1). These areas were all integral to their motivation to stay with their degree, which many discussed as being highly competitive and in sharp contrast to their disadvantaged secondary school environments. In approaching the analysis this way, we foreground how their aspirations are maintained, which requires thinking about their identity work as informed by specific identity resources (Fig. 1).

Desire for financial stability and fulfilment

Within studies of how working-class masculinities are produced, there has been a continual emphasis on the desire for secure forms of reliable employment (Nayak, 2006; Noble, 2009). In exploring the subjectivities of working-class males, Stahl (2018) documents how many young men from disadvantaged backgrounds considered university degrees as a rite of passage to the job market in the knowledge economy and a secure way to avoid undesirable manual labour. However, despite this belief, they did not always pursue higher education (see Stahl, 2022). While there has been social and economic change, becoming an established breadwinner

Table 1 Overview of STEM participation from anonymous research project

| Participant	Ethnicity	Chosen degree	Elite institution	Status	Family background F = father, M = mother
Vuong	Vietnamese-Australian	Advanced maths	Elite	Completed	Labelling factory (F), stay at home (M)
Levi	Anglo-Australian	Forensic science	Non-elite	Completed	Plumber (F), office manager- physiotherapy (M)
David	Pacific Islander	Civil engineering	Non-elite	Did not complete	Unemployed (Both)
Manny	Samaoan	Mechanical and mechatronic engineering	Non-elite	Changed to study of education	Factory worker (F), receptionist (M)
Adam	Anglo-Australian	Bachelor of science	Elite	Completed	Test lead/technician (F), SSO office (M)
Ruir	Asian	Sports science	Non-elite	Completed	Construction business (F), unknown (M)
Tobias	Anglo-Australian	Human movement	Non-elite	Completed	Fork lift driver/clerk (F), food and hospitality team leader elderly (M)
Isaac	Anglo-Australian	Sports science and psychology	Non-elite	Completed	Teacher support (M), unknown (F)
Logan	Anglo-Australian	Evolutionary biology and ecology	Elite	Completed	Childcare worker (M), chicken factory (F)
Dominic	Aboriginal	Engineering and project management	Non-elite	Completed	Accountant (M), mechanic (F)
Frank	Anglo-Australian	Exercise and sport science or human movement	Non-elite	Did not attend	Building grounds manager (F), human resources supervisor (M)
Samuel	Vietnamese-Australian	Software engineering	Non-elite	Completed	Farmer (M), farmer (F)
Sebastian	Pacific Islander	Civil engineering	Non-elite	Did not complete	Data not available
Rashid	Bangladeshi-Australian	IT and business	Semi-elite	Completed	Hospitality (F), retail (M)
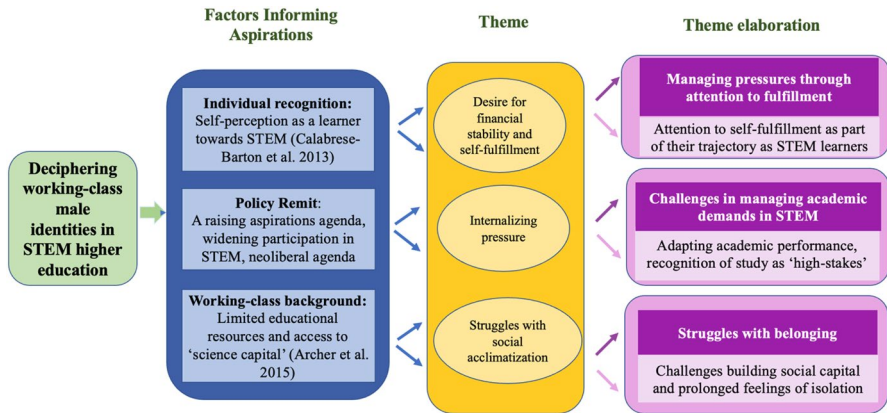
Fig. 1 Factors informing STEM aspirations

remains a vital identity resource for men, though, in a post-industrial economy, these forms of employment are becoming increasingly scarce (Stahl, 2022). Therefore, unsurprisingly, with the young men we spoke with, we see a strong focus on employability:

> David: [With STEM] I've heard that there will be a lot of jobs available… I come from a poor family, so I want to help my family out in the future. … I guess I'm the one in the family that has to succeed in life I guess, help them out in the future, get us out of where we are right now financially. It's mostly about the finances, so if I can help out with that, that's what I want to do.

For David, who eventually dropped out of his civil engineering degree, the pressure to be a breadwinner was very important to him, where he stated, 'As soon as I stopped the uni…Then I felt the pressure to get back onto the path and to help with the bills and stuff—finding a job.' Besides the desire for financial stability, participants also focused on self-fulfilment in what they chose to study. As Ruir, who studied in sport science, said:

> I don't want to just look for work because they pay a lot of money. I want something that pays a decent amount of money…. I want to have a secure job. I just don't want to, like, struggle. I just want to be comfortable.

The responses of David and Ruir suggest that the perception of future employment in STEM informs how they see themselves at university and *after* university. David and Ruir's motivations for going and staying at STEM higher education gravitate around economic mobility and the quest for a 'good life' (Stahl, 2012). This also chimes with research by Maras (2007) and Gore et al. (2015c), who found that students who are first-in-family were often motivated to participate in higher education to secure better job prospects.

While the desire for secure forms of employment was present, we found it was often coupled with a strong desire for fulfillment through employment. Many felt

a vocational pathway would set them up well financially[3], but they did not feel it would be fulfilling enough (Stahl, 2022).

> Ruir: I want something that pays a decent amount of money – but I enjoy waking up to it everyday.

Furthermore, the participants' motivations seemed influenced by the suffering they saw with the older men in their family.

> Frank: The apprenticeship wages are very bad—my [older] brother did an apprenticeship—I want to be able to be doing a job that I love and that I want to do for the rest of my life.
> Levi: Without disrespecting my dad, I see him doing a career he doesn't like. I use that as my motivation…

Previous research by Archer (2003) captures how working-class young men did not often see university qualifications as having symbolic capital that would confer them status and prestige within their society. Our data echoes this finding as, for the most part, the STEM boys frame their social mobility journeys as grounded in both personal fulfilment and pragmatic employability. There was very little evidence in the data of boys expressing pride in being the first in their family to study at university. What a desire for fulfilment highlights is the complex nature of becoming socially mobile, which involves reformulating emotional, social and spatial attachments (see Pimlott-Wilson, 2015) we associate with upward mobility. As they seek to advance themselves, these young men are compelled to navigate this tension, which, in turn, informs the subjectivity they present. This echoes early work on socially mobile working-class men as Tolson (1977) writes of how men 'must negotiate barriers of definition and find ways of coping with the shifting of his identity' (p. 13). At the same time, we acknowledge research which has highlighted how working-class males are interested and active in their learning when it is not associated with an expectation around social mobility (Asplund, 2021; Stahl & Dale, 2013).

Internalizing pressure

Many students in STEM disciplines find university to be stressful due to its competitive nature. In thinking about how the STEM experiences of these young men are informed by societal discourses and discursive framings informing their complex identity work (Davies, 1989), the university is socially constructed as a high-stakes environment. Other recent research has highlighted how males often adopt an 'easy-going' attitude to counteract some of the stresses they encounter in higher education (Burke, 2009; Nichols & Stahl, 2017). Students from low socioeconomic backgrounds are often very aware of the financial investment in their degrees and anxious about translating their degrees into secure employment. Vuong, who was studying math, often spoke of how money contributed to a feeling of pressure (e.g., 'The money that I—the debt that I have') where he also said

if he did withdraw from university, 'I'd feel like a failure. I'd feel like my entire world would come toppling down.'

Archer et al., (2010a, 2010b) explain how social inequalities can play a significant role in moderating the aspirations of working-class students to resort to what could be considered pragmatic aspirations in order to secure stable employment as soon as possible after graduation. Thomsen (2012) also states that the uncertainty of career prospects can negatively impact the university experience of students from non-traditional backgrounds, limiting their aspirations even before they begin their studies. This statement is confirmed by David, who aspired toward a career in robotics but chose civil engineering instead as he believed it to be a 'safer route' where the job prospects were more promising.

> David: I feel like if I did do something else, I'd be even more behind, so I just chose civil. And there's also jobs coming in the future like the airport.[4]

Using the rationale of supply and demand in the job market as guiding point, Frank, who intended to major in Exercise and Sport Science or Human Movement, saw university qualifications as valuable assets but only when there is no saturation in those specific fields,

> Going to uni isn't very empowering if you don't get anywhere—it just depends on how well you do in that field, so, if it's a high demand—if it's an occupation where there's high demand in the future, then there's—it's definitely going to be empowering.

Highlighting another dimension of how these young men realised their aspirations was their internalised pressure and stress. Ruir noted, 'I feel like pressure of like, to get my like, the highest I can get'. This high-stakes nature contributes significantly to how the participants acclimatise to higher education; a major theme was the prominence of stress. Isaac describes the pressures of university studies as always present:

> Probably, just the 24 ... Not 24/7, but constant thinking about uni all the time, and worry, not worrying, but thinking I got to do this, this, this, I still go to do that. I got this coming up. There's just constant thinking about it all the time. It's not bell to bell, start the day, do my school work, go home, that's it. It's come in, do your uni work, go home and do some more lectures, do some of this, this, this because obviously, work takes up time and then uni takes time as well, so you can't fit everything into the day. You got to spread out of it a bit.

Stress, while confronting, also, existed alongside a desire for self-care. Reflecting on his progress over the course of his first year, Levi said:

> Definitely learnt to look after myself a lot more. I found myself burning both ends of the candles a lot. So, I definitely think sort of taking care of myself, even stuff as simple as going to bed at reasonable times because I mostly work nights I'm usually up late.

While responses to pressure were certainly present in the data, in terms of tensions, many of the participants presented a subjectivity of being realistic, echoing other research focused on students from non-traditional backgrounds navigating higher education (see Lehmann, 2012). We would argue that being realistic, or level-headed, is reflective of the complex identity work of aspiring beyond one's social circumstances and the incremental nature of becoming socially mobile (Johnson & Lawler, 2005). For David, he stated, 'It's good to be ambitious but for me, I think keeping it realistic, I have to keep it realistic as well'. Here, we see David both aspiring but also moderating his aspirations, which was reflective of other data.

Part of being realistic was how the participants regularly documented their progress in relation to others who were less successful in higher education, given the high-stakes environment they were in. Highlighting the importance of being realistic, Isaac said:

> I think just finishing the year to be honest, because a lot of people dropped out, a lot of people from school dropped out, and I'm thinking well if I can manage this by myself, although I didn't really have help from mum and dad 'cause they haven't been to uni before. A lot of people dropped out or said they'll come back later…

We often think of students adapting to higher education as a linear process. However it is usually a series of affective adaptations, where their identity work, as discursive practices, is not fixed but requires adaptability in order to navigate the demands of university study (Fig. 1). According to Levi, he describes higher education as:

> I definitely think it has been emotional both stress—mix or at … times very stressful. Other times it's just - it feels like everything's falling into place and then something else is thrown at me. I definitely think it's a lot of it's up and down, up and down and…

As Isaac articulates 'I think it's worth all the struggles now, like [be]cause everyone I've spoken to says, "Oh just go to uni, do a degree and then you don't have to do it [in future]"'.

Struggles with social acclimatization to university

Echoing research on the first-in-family student experience and struggles with belonging (Smith, 2016; Ulriksen et al., 2017), isolation was a significant theme in the wider data from *The First-in-Family Males Project* (Stahl, 2021, 2022). For the STEM boys, as the field is still largely dominated by males from middle-class and elite backgrounds, these spaces can be ostracizing to working-class males. In considering their sense of loneliness, we note two contributing factors, specifically how very few students from their secondary schools attended university and the competitiveness associated with STEM, which created social hierarchies/divisions. Highlighting his class disadvantage, Vuong did struggle with the academic demands of an elite institution. He recognised how he was one of the only students

from his secondary school to attend university, 'if I did this well, and I can match up with these types of students who did a much more higher end type learning in their schools or whatever, and I came from a disadvantaged school'. Furthermore, Ruir described the other male students on his course as 'They're more serious' where 'I feel like everyone knows everyone'. According to Isaac:

> I mean maybe the first half of the year if my mate didn't rock up that I knew from school…if he didn't rock up, I sort of felt a bit out of it 'cos I didn't know anyone. But then, like I said, getting to know people was a bit easier, and that sort of disappeared in the second semester a bit.

While all experienced isolation, many of the young men we spoke with recognised the issue and found ways to acclimatise themselves to university. For example, Levi said 'I tried to get myself involved in uni activities as well. I went to uni games and did other stuff on … and events and stuff so I definitely put all that into the spectrum'. In contrast to Levi's journey of acclimatisation to university, David suffered both socially and academically, leading him to eventually drop out:

> I was way too behind, so if I maybe prepared better if I prepared better for uni…people … friends. That would make it a lot easier – sporting friends.

The contrasting experiences of Levi and David are interesting. Both attended the same university and were very sporty. However, Levi owned a car, which allowed him to both pick up part-time work and get to the necessary practices and away games, while David depended on public transportation, which limited his access to opportunities. Levi's involvement with sports and extracurricular activity serves as a counter-narrative to the struggles many working-class students face in their acclimatisation to higher education. As he describes it:

> These new friendships I've built, like this one from uni and these ones from my netball team, help a lot. Just going to them, they help me out, it's fantastic. I can always lean on my parents as well. Always there. I've definitely got a support group ….

Ulriksen et al., (2010) explains how students who align their lives with the dominant university culture become legitimate participants and experience less isolation. Wenger et. al (1998; 2009) further add, that with time, individuals learn how to transition from peripheral participation to full participation within communities of practice; they experience a sense of belonging which can work to reaffirm their aspirations.

Discussion

In our current neo-liberal times, young people from disadvantaged backgrounds are often framed by policy agendas as having a 'poverty of aspirations' (McInch, 2022). Working-class young people can often be pathologised for not aspiring to white-collar forms of employment. Furthermore, boys and young men from

disadvantaged backgrounds are often problematically cast as 'heroes' or 'zeroes' depending on their aspirations and level of academic engagement (see Francis, 2006). In mapping working-class masculinities in STEM, there is a complex interweaving of masculinities, identity work, social class and aspiration (Fig. 1). Our research problematises the notion of a poverty of aspirations. Instead, these young men struggle with limited resources, negotiating a variety of concurrent pressures in accessing higher education. The point here is that when *aspirations are raised* for working-class males, there is a need to consider the intense pressure they put themselves under and how they engaged in the labour of reifying their aspirations.

Within *The First-in-Family Males Project,* 14 out of 42 participants enrolled in science subjects, suggesting masculinity still has a strong association with STEM. We recognise that the study of STEM is varied and can often set individuals on very different trajectories (Table 1). STEM is a slippery term given how there can be a lack of analytical rigour around different disciplines (e.g. agricultural science vs. physics) and sub-disciplines (e.g. civil engineering vs. chemical engineering; computer science vs. cybersecurity). Participants in this study pursued a variety of STEM-related degrees (e.g., Advanced Maths, Forensic Science, Civil Engineering, IT, etc.). There were only two students enrolled in an IT related course of study. Of the boys who chose engineering degrees, only Dominic completed his engineering course. While we do not have the data to make any assertions regarding academic unpreparedness, we note that these young men attended schools that faced notable challenges in delivering STEM education which may have contributed to this trend in the data.

While our dataset is small, in surveying Table 1, we see evidence of a trend where the participants largely pursued degrees which would lead to STEM-related employment they were familiar with, largely based on their experience with sport. For instance, Tobias, Isaac, Ruir and Frank chose to study Sports Science or Human Movement because those subjects aligned well with their passion for sports. Within their working-class communities, the relationship between masculinity and sport was celebrated and formed an integral and inescapable part of their lifeworlds, contributing to how their masculinities and aspirations were produced. In his scholarship on masculinity and subjectivities, Pease (2000) writes:

> Thus, masculinity is not an inherent property of individuals. Rather, we learn the discursive practices of society and work out how to position ourselves as 'male' of a certain type…Our masculine sense of ourselves is historically provided in a series of social practices within different discursive frameworks. Within these frameworks we are invited to take up or turn down different subject positions and a sense of masculine identity that goes with them. That is, each framework enables men to think of themselves as men in particular ways… (p. 35)

With reference to these young men from working-class backgrounds studying STEM, we see how the realisation of their aspirations and their trajectories are still heavily influenced by class and gender. While they may be able to 'take up or turn down different subject positions', this occurs within certain limitations as their sense

of masculine identity is still heavily informed by societal discourses and their social realities.

Conclusion

The research presented in this article is informed by a growing interest in men from non-traditional backgrounds studying STEM in higher education (Danielsson et al., 2019; Pelch, 2022). Given how, largely, working-class young men continue to not participate in higher education nor engage in STEM-related subjects, it is imperative we document how they experience university life and the subjectivities they present. We consider their journeys and subjectivities as informed by societal discourses of gender and class. Furthermore, these are also stories of becoming socially mobile and the risk, cost and benefit involved with such a pursuit. Our analysis highlights how they modulate their aspirations and negotiate the pressures they experience as learners. As neoliberal policies continue to focus on *raising aspirations* for young people from disadvantaged backgrounds, it is important to ask what happens when aspirations *are raised* and how working-class young people navigate their studies with limited resources in order to ensure their success as well as considerable additional pressures. This we feel not only has significant social justice expectations, but also encourages critical discussions about the role of universities in helping students from disadvantaged backgrounds establish 'a good life' through a variety of support mechanisms (Stahl, 2012).

Endnotes

1. Archer et al. (2015), define 'science capital' as the collating of various types of economic, social and cultural capital that specifically relate to science and which foster participation in science.
2. Logan's words inferred that physics and chemistry were offered on a limited basis at this secondary school especially in upper secondary, which is not uncommon for schools in disadvantaged areas in Australia.
3. For the most part, trade work is a highly paid profession in Australia.
4. Here David is calling attention to a new airport which is being built in Sydney's western suburbs.

Data availability The data is not publicly available.

Declarations

Competing interests We report no competing interests.

Ethical approval Ethics was secured through the University of South Australia and the University of Queensland. All ethics procedures were followed assiduously.

Declaration regarding artificial intelligence (AI) utilization No artificial intelligence (AI) technologies were utilised in the writing of this paper.

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