ROYAL SOCIETY OF CHEMISTRY

SCIENCE CULTURE

A sense of belonging in the chemical sciences

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Foreword

I still remember my chemistry teacher inspiring me with her leadership. She had a PhD in chemistry and made me feel that I could find my place in the chemical sciences, and aspire to become a leader.

I also remember a less positive experience whilst at university. A colleague told me that they assumed I wouldn't want to start a family as I was doing a PhD and being an academic researcher was not compatible with being a mother. They said if I was intending to start a family then I would have wasted my time doing a PhD. This made me feel like I didn't belong in academic research.

We all have times we feel we belong or don't belong, but we're not all affected equally.

Our study on *Belonging in the Chemical Sciences* is the first to ask chemists directly about their experiences in this area. We found that chemists from under-represented groups are more likely to feel like they don't belong at work and this negatively impacts their lives and careers.

We know that the culture of the chemical sciences needs to change. We are losing out on the talents and perspectives of too many groups, including women, people from minoritised ethnic groups and those who have taken non-traditional routes into chemistry.

The work the Royal Society of Chemistry has done in recent years highlights the lack of diversity in our profession and the challenges of bullying and discrimination.

What our new research shows is that for inclusion and diversity initiatives to succeed they must also consider what helps people belong.

When people feel they belong, they are more able to share their ideas, be creative and collaborate. Not only do they enjoy their work more, but they perform better. The result is that they are more likely to stay in our profession and contribute to the success of the chemical sciences.

We have identified a series of steps that we and other organisations can take to help everybody in the chemical sciences feel like they belong. We will be acting on these recommendations and working with others to put these recommendations into practice.

Our ambition is to make the chemical sciences a community where everybody can do their best, regardless of their background or the identities they hold.

Dr Helen Pain CChem FRSC Chief Executive, Royal Society of Chemistry

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For further information, please email **diversity@rsc.org**

Executive summary

The Royal Society of Chemistry is committed to making the chemical sciences more inclusive and diverse. But research shows that including people isn't enough. Unless people feel they belong, they are unlikely to thrive in our profession. That's why we commissioned the first ever study of chemical scientists' lived experiences of belonging in the chemical sciences.

This report presents the findings of that study. It is based on in-depth discussions with chemists from the UK and around the world, who shared their experiences through virtual interviews and focus groups in the spring of 2021.

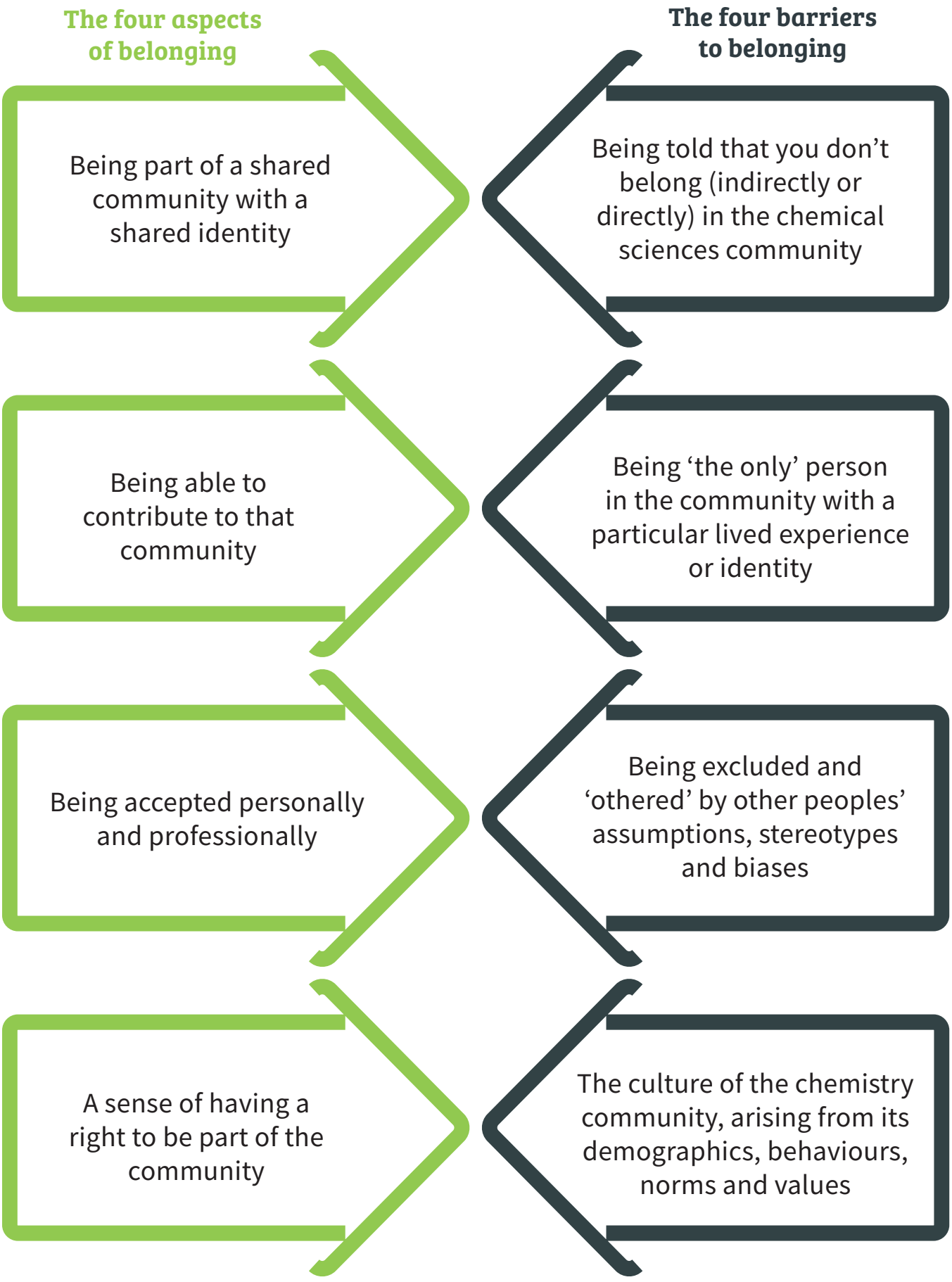
Belonging matters to chemists. Everybody we spoke to said their sense of belonging in the chemical sciences mattered to them. They were clear that action to build belonging is important.

Belonging at work impacts chemists' well-being. Chemists said that their sense of belonging affected their self-confidence, self-esteem, sense of self, mental health and well-being.

When chemists feel they belong, they do better work. Chemists said their sense of belonging impacts innovation, creativity, productivity, collaboration, performance, progression and retention. As a result, feeling like you belong leads to better science outcomes.

Questions of belonging, and experiences of not-belonging, are particularly important for people from under-represented groups in the chemical sciences. Chemists in the focus groups on race and ethnicity, disability and LGBT+, and those who described themselves as being from less privileged socio-economic backgrounds, shared exceptionally powerful stories of the impact of not belonging.

Chemists highlighted four aspects, four barriers and five enablers of belonging in the chemical sciences.



The five enablers of belonging

Connection
Experiencing positive, professional relationships that are supportive, kind and encouraging.

Respect
Feeling accepted and respected for whoever you are, whatever your professional background, gender, race or ethnicity, sexual orientation, age, socio-economic background, or disability.

Diversity
Not having assumptions made about you, or having other people reduce your uniqueness to a stereotype.

Inclusion
Seeing evidence of organisations taking action to create an inclusive culture.

Intention to belong
Developing and displaying self-confidence, and sometimes having to adapt or hide aspects of yourself to fit in.

We can all take action to help everybody feel like they belong in the chemical sciences. We have set out a series of action points for individuals and organisations in this report.

Our three commitments

1. We will host further conversations about belonging with our governance, boards and committees, networks and communities.
2. We will further develop our existing networks for members and non-members to foster a greater sense of belonging in the chemical sciences.
3. We will develop a toolkit to help organisations and individuals foster belonging in the chemical sciences, using the five enablers and other insights from this study.

1 Introduction

Belonging matters. It affects chemists' ability to share ideas, try new things, collaborate and ultimately to enjoy their work and stay in the profession.

We have conducted the first ever research on what belonging means to chemists and what helps or hinders their sense of belonging in the chemical sciences.

Our sense of belonging is subjective. It arises from our day-to-day experiences. We therefore carried out a qualitative study to better understand this phenomenon.

We held a series of online interviews and focus groups with chemists based in the UK and internationally in spring 2021. We asked them about their lived experiences of belonging and not-belonging in the chemical sciences.

Belonging at work mattered to everybody we spoke to. Everybody shared examples of when they felt like an insider, and when they felt like more of an outsider.

However, belonging (like inclusion) and not-belonging (like exclusion) are particularly important in the lives and careers of those groups already under-represented in the chemistry community.

A range of factors were associated with a sense of not belonging at work, including gender identity, race and ethnicity, disability, sexual orientation, age, socio-economic background, science background and current job role.

This study enriches the quantitative and qualitative data we have previously gathered on inclusion and diversity in the chemical sciences.

It helps us better understand how to make the chemical sciences a community where people from all backgrounds feel welcome and can do their best.

2 What is belonging?

The chemical scientists we spoke to highlighted four key aspects of belonging:

Being part of a community, whether that's a work team, an organisation, or the chemical sciences more generally. This involves sharing a sense of identity, values, ways of thinking and speaking ("speaking the language of chemistry"). It also means seeing yourself and others as a member of that community ("I am a chemist").

Being able to contribute to the community. This is about chemists seeing themselves – and being seen by others – as a valued member of the community. It's about feeling able to contribute opinions, speak up or share a different viewpoint, without worrying too much about sounding silly or making mistakes.

> **"When you feel part of a group, even if you make mistakes it doesn't affect you so much, you feel everyone makes mistakes sometimes, and you bounce back more easily."**

Being accepted and respected both personally and professionally. This means being able to be fully oneself, without having to hide aspects of your identity. It's also about being recognised professionally. It's the feeling that this community is my home, a place of safety.

> **"[Belonging is the feeling you get] when you get your first publication or go to a conference, when you get your PhD, when people recognise you."**

Having a 'right' to be part of the community, because of who one is or what one has achieved, irrespective of how one is seen by others.

3 Why belonging matters

A sense of belonging leads to better science outcomes. Chemists said they are more innovative and creative when they feel like they belong. They worry less about being judged and feel freer to share their opinions and give things ago. They are more passionate about their work, more collaborative and more focused.

"When I felt I belonged, I was very productive, I collaborated a lot, I really enjoyed it."

"When you don't feel you belong you feel you're not really doing good science, it's not amounting to anything, you're not hitting the bar."

Conversely, not belonging negatively impacts science outcomes. Chemists who don't feel they belong are less likely to contribute their ideas, are more hesitant or qualify what they say.

"I qualify what I say. I say, 'maybe this is a bit naïve of me' or 'sorry if I've misunderstood', so it's not perceived as offensive. I feel I'd be judged if I didn't."

Belonging improves mental health and well-being. When chemists feel they belong at work they feel happier and more confident, energetic, motivated and empowered.

'When you belong, you feel like you have self-worth, self-esteem, self-confidence, that you are part of a group providing support, sharing knowledge, empowering you'.

Not belonging impacts performance, progression and retention. Chemists described how feeling like they don't belong is associated with a sense of under-performance, of losing motivation, falling 'out of love' with chemistry, and seeing their career stall. Over time, not-belonging leads chemical scientists to ask whether chemistry is the right place for them.

> **"At this point in my life I do feel I belong - I'm not sure I've always felt that way. There were times in my life when things were really tough; many of us have felt imposter syndrome at times. There were times when I considered leaving the pathway I was on."**

This is supported by existing research on belonging. A range of studies have shown that a sense of belonging is associated with academic achievement, retention and performance at every stage, from school[1] to university and college[2,3], to graduate students and postdoctoral researchers[4].

In the workplace, employees who feel a strong sense of belonging are:

Feeling like you don't belong at work is painful, distracting and exhausting. We know from neuroscience research that the social pain caused by not-belonging can create a response in neural processing similar to that that caused by physical pain[6]. Similarly, chemists described the pain and trauma of feeling they don't fit in, and how exhausting it can be having to fight to belong.

"You feel you have to fight to be accepted, fight to belong. But sometimes I can't be bothered to fight, you become tired of it. But if you don't fight, you don't get there. You have to have a fighting spirit. When people are tired of it, they drop out. It's a never-ending circle."

"Self-doubt and questioning take their toll. It's exhausting."

For under-represented groups, not belonging often means having to hide aspects of themselves at work. Many of the chemists we spoke to from under-represented groups said they changed themselves to feel accepted at work. They talked about hiding aspects of their experience and identities, from their ethnic identity or sexual orientation, to their accents or problems with childcare or mental health.

"I picked up that I have to adapt to fit in. I need to behave in a certain way, laughing at jokes that I don't think are funny, turning up my accent to make me sound more educated."

"I feel I've had to hide or hold back on a lot that would have been nicer to share."

4 What gets in the way of belonging?

1. Being told that you don't belong directly or indirectly.

Feelings of not-belonging can start early, often prompted by what other people say. Several chemists shared stories of being told by family, friends, colleagues or managers, that they wouldn't be able to do a chemistry degree, get funding for a PhD or become a lecturer, or that chemistry really wasn't for them. This had a lasting impact, even on those who subsequently found their place in the community.

Sometimes chemists inferred they didn't belong from indirect comments or behaviour. For example, being passed over for professional opportunities without understanding why, a feeling of not being taken seriously as a professional and contributions being ignored or not acknowledged.

2. Being the only one with a particular lived experience or identity.

Chemists described how the absence of other people "like me" impacted their sense of belonging in the chemical sciences. For example, being the only person from a minoritised race or ethnicity in the team, the only out LGBT+ person or the only person with a mental health problem willing to share it.

"The higher up you go, the less women there are, and the more women feel like they don't belong."

"There has not been a good role model throughout my entire career in the chemical sciences with the same ethnicity as me."

"When I struggled with mental health, I didn't feel I belonged, as I couldn't see others like me suffering in the same way."

3. Being excluded and 'othered' by peoples' assumptions, stereotypes and biases

We heard several accounts of the ways in which exclusion and discrimination impact chemists' sense of belonging. Other people's assumptions, stereotypes and biases - conscious and unconscious - get in the way.

One chemist described the impact of being repeatedly told "you're cleverer than you look" and being regularly asked "who is your PhD supervisor?" years after completing their doctorate. A chemist in the focus group on disability described the scepticism and doubts they have faced - throughout their career - about their ability to do the job because of their disability. And a chemist in the focus group on race and ethnicity described the ways in which repeated micro-aggressions contributed to their sense of not-belonging at work.

"There was a group of White male chemists who always went to lunch together... If I asked can I join them they would always say yes, but the conversation would stop... The big things like outward racism have been dealt with, unconscious bias training has been dealt with, but it's the subtleties that make you feel like you don't belong."

Gender stereotyping and belonging

A US study of women in mathematics found that their sense of belonging in the discipline was impacted by the presence of negative stereotypes about women's mathematical abilities, and by the message that mathematical ability is a 'fixed trait' - you either have it, or you don't[7]. The more women perceived gender stereotyping and had a fixed trait view of ability in their faculty, the more vulnerable they were to a lowered sense of belonging.

This can make people feel 'othered'

Several participants used the term 'othering' to understand their sense of not-belonging. The Othering and Belonging Institute (OBI) in the US defines 'othering' as a "generalised set of common processes that engender marginality and group-based inequality across any of the full range of human differences"[8].

> **"At coffee breaks, there are only two of us female academics, and all the men are huddled together. You go in and they say to you 'excuse me, don't mind my four-letter words', and you immediately know you don't belong."**

Not being believed or supported by colleagues makes exclusion and discrimination worse.

Other chemists said their sense of not-belonging could be exacerbated by the response of colleagues to the experience of exclusion and discrimination. A PhD student spoke about being given a racist nickname and how the HR team did nothing in response, which made them feel like they didn't belong.

A chemist in the focus group on disability described their sense of exclusion and not-belonging when colleagues didn't want to discuss how to make the working environment more suitable.

> **"None of the people running the lab wanted to engage in a conversation about my reasonable adjustments."**

4. The culture of the chemistry community

Underlying these experiences of not-belonging is how chemical scientists experience the culture of chemistry, arising from its demographics and shared values, norms, behaviours, skills and experiences. This includes:

The lack of diversity in the chemistry community, particularly at senior levels, which has shaped its culture in ways that mean it can be harder for women and chemists from minoritised ethnic groups to feel like they belong. The presence and behaviour of cliques with their own strong sense of belonging, demonstrated for example through nicknames and in-jokes, can reinforce other people's sense of not fitting in.

> **"The Head of Department has nicknames for their cliquey group. I didn't have a nickname, so I immediately knew I didn't belong."**

In academic chemistry, a tendency towards a critical, competitive culture, and the under-valuing of interpersonal and 'softer' skills, may reinforce the sense of not-belonging for those chemists valuing a more collaborative, supportive environment.

> **"I was told I don't come across as a chemist because I've got really good soft skills. Apparently, you can't be both good with people and technically good as well."**

An elitism about 'pure' chemistry, which means people with a different or interdisciplinary science background, as well as those from less privileged socio-economic backgrounds, can find it a struggle to feel like they truly belong.

> **"I do feel as though I belong at the moment, but it wasn't always that way. My first degree was combined chemistry and biology, then I moved into pure chemistry. I had a battle to be accepted into chartership because of not following the traditional route into chemistry."**

Belonging uncertainty

The phrase **belonging uncertainty** is used to describe periods of heightened concern about belonging, often associated with transitions, such as starting a new course, job or role. Belonging uncertainty is felt especially strongly by members of groups under-represented in a given environment.

A study of female students in chemistry found that those from under-represented minority groups in particular, reported lower belonging and higher uncertainty than male students within the first weeks of the course[2].

We asked chemical scientists about the times that they have felt most uncertain about belonging, and their experiences were similar. The first year of university, starting a PhD, returning to work after maternity leave, the first year in a new job, the early years of a career and relocating to a new country are all experiences which create belonging uncertainty. They also identified other circumstances which were likely to provoke uncertainty, often related to being overlooked or ignored or disrespected at work.

"Everyone's nervous in a new job. But for me it's when something crops up with my disability. As soon as you have to highlight your difference and deal with the reactions, not just advocating for yourself but having to defend yourself, that's when the sense of belonging is smallest."

5 The five enablers of belonging

The insights from the chemists involved in this study suggest there are five enablers of belonging in the chemical sciences. These are:

1. Connection

- Making authentic, human connections with other people at work.
- Experiencing positive professional relationships, that are supportive, kind and encouraging.
- Feeling connected with the chemistry community, not just with individual chemists.
- Having a sense of connection with people as role models and mentors.
- Having a shared sense of identity with other people, and a shared understanding of each other's lived experiences.

"Within that group of other D/deaf scientists, I feel I do belong. We have a shared language, and we can talk about our passion for science."

2. Respect

- Feeling accepted and respected for who you are, whatever your professional background, gender, race or ethnicity, sexual orientation, age, socio-economic background or disability.
- Being seen and heard, having your experiences recognised, taken seriously, and at face-value, feeling validated.
- Being recognised by others for your successes, skills and experience, including non-technical skills.
- Feeling respected professionally, being asked for your opinions, being enabled to speak up and be heard.

"I had a supportive supervisor, who treated me like my ideas were valued. I'd never had that before. That made me want to continue in academia, where other experiences had dissuaded me."

3. Diversity

- Not having assumptions made about you, or having other people reduce uniqueness to stereotype.
- Being in an environment in which there is visible diversity amongst peers and colleagues.
- Working in an environment in which chemists from historically under-represented groups can see people like them in similar and more senior roles.
- Others' willingness to listen and learn about difference.

"I went to an international student conference. Everyone was from different countries, it really helped me feel I belong. We all accepted we were different. There was no minority, no majority, everyone was different."

4. Inclusion

- Seeing evidence that an organisation taking action on inclusion and diversity.
- Being treated fairly in terms of access to opportunities, promotion and progression.
- Being included in proposals, meetings, events and social gatherings.
- Feeling that the workplace is a psychologically safe environment.
- Having one's own needs, for instance on disability access or flexibility, taken seriously and accommodated.

"You're in a meeting and you see a rainbow in somebody's background and you feel, this is somewhere where I belong."

5. Intention to belong

Chemists said there were a range of actions they themselves took to help them feel like they belong. However, they were clear that the responsibility cannot be on individuals alone, and they shouldn't have to compromise their values or sense of self to fit in.

- Being 'non-conciliatory', recalling the qualifications, experience and effort that mean one has a right to be here.
- Developing and displaying self-confidence, hiding vulnerabilities, to match the self-confidence of those who are perceived to belong.
- Doing what feels necessary to fit in, whether that's intentionally seeking out individuals and groups with shared values, or leaving one's personal life at the door of the lab.
- Code-switching, i.e. adjusting one's style of speech, appearance, behaviour, and expression in ways that will optimize the comfort of others. This can contribute to promotion and progression at work, but often comes at the cost of individuals' mental and physical health.[9]

"Once you start to behave like the others, then you start to fit in. My culture is flamboyant. I've tried to integrate by not bringing my personality to the fore, but it's grinding me down. I'm not who I used to be. I'm missing myself. You have to change to fit in, but then you stop being yourself, stop recognising yourself."

Belonging and inclusion

In her seminal 2011 paper, Lynn Shore[12] proposes that inclusion is a function of both diversity (uniqueness) and belongingness. Professor Shore suggests organisations and groups that place a low value on either diversity or belongingness result not in inclusion, but in experiences of exclusion, differentiation or assimilation instead.

	Low belongingness	High belongingness
Low value placed on uniqueness	**Exclusion** Individual not treated as an insider with unique value, but there are others who are insiders	**Assimilation** Individual treated as an insider when they conform to organisational/ dominant culture and downplay their uniqueness
High value placed on uniqueness	**Differentiation** Individual not treated as an insider but their unique characteristics are seen as valuable and required for group/ organisational success	**Inclusion** Individual treated as an insider and allowed/ encouraged to retain uniqueness within work group

The chemists we spoke to also see inclusion and belonging as two distinct concepts. From their perspective:

- Inclusion describes the steps that organisations take to address under-representation and exclusion. It is important work, but attracts some scepticism for being performative and procedural.
- Belonging describes a feeling, an individual's personal experience of being seen and heard. It is a more genuine and trustworthy concept than inclusion.

How chemical scientists see inclusion	How chemical scientists see belonging
Action	Feeling
Organisational	Individual
Collective	Personal
Procedural	Genuine
Being given a seat at the table	Being heard

6 How to build belonging

Belonging is personal, and the actions that make the most difference to the sense of belonging for one group are not necessarily the same for all individuals in that group, or for other groups.

However, we have identified a range of actions that individuals and organisations can take to help every member of the chemical sciences community feel like they belong.

Building a culture of belonging

Actions for individuals

- **Take responsibility for raising one's own awareness and understanding of diversity**. One chemist described this as being aware *"every day of every year, not just once a year"*, for example when certain diversity and inclusion initiatives are publicised.
- **Be mindful of how everyday behaviours can make people feel they don't belong**. These are sometimes known as 'micro-aggressions.' For example, not inviting colleagues to informal social events, or using in-jokes that others in the group won't understand.
- **Listen to and believe people when they share experiences of not belonging**. This includes being open and curious about people's lived experiences and taking them at face value, particularly for those from under-represented groups.
- **Encourage and support colleagues, irrespective of their background**. This includes everyday acts of kindness like inviting somebody to sit next to you at a meeting.
- **Respect all colleagues as professionals**. This includes being fair and intentional about asking for and acknowledging professional input.
- **Challenge the exclusion and discrimination of others**, including calling out prejudice and disrespect. This is particularly important if you have privilege or power, for example due to your position in an organisation, gender, race and ethnicity or other factors.

“[Do] something to change narratives you don’t agree with, rather than just saying you don’t agree.”

“We had a departmental book club on race, sexuality, gender. I learned so much about biases I didn’t know I had.”

“Especially in chemistry, people tend to be presented with a fact and then debate it. But on an individual level it really helps not to have the things I’ve experienced - the discrimination I’ve faced - be a subject for debate. It helps not to have to feel like I need to know all the papers about queer women of colour or back up my experience with statistics, just to be heard.”

Actions for organisations

- **Increase diversity in the chemical sciences community**. This is particularly important at senior levels, to create a wider range of role models and mentors.
- **Incorporate belonging into inclusion and diversity strategies**. The five enablers of belonging identified in this report are a useful guide, although we suggest that such a strategy is co-produced with colleagues from diverse backgrounds.
- **Create opportunities for people to talk** about their experiences of belonging, and not-belonging, and be heard and validated.
- **Make networking more inclusive**. This includes making existing networks (informal and formal) more open by letting everybody know about how to access them. It also means supporting the development of networks for under-represented groups so they can connect with "people like me."
- **Increase accountability for those in position of authority**. Creating a culture of belonging should be an explicit part of managers' and leaders' jobs as part of their responsibility for the wellbeing of their teams.

"It's about making people feel like they are part of the bigger group."

"Get people talking about [race], get White people talking about it. People don't want to talk about it in case they get it wrong, in case they get into trouble. But if you don't talk about it how are you going to find answers?"

"Are the people in the team happy, do they feel accepted, like they belong, genuinely, not in terms of being a square peg in a round hole? Holding leaders to account for their team's emotional state."

Building your own sense of belonging

- **Seek out and nurture supportive relationships**. This includes building relationships with people who share the same lived experiences, as well as advocates and allies. This could be through getting involved in activities such as volunteering, teaching or joining work groups and committees.

> **"[When] I moved to chemistry I felt like an outsider. I felt like I had to justify myself for being there. But I started feeling a sense of belonging when I began teaching, became more involved with the RSC."**

- **Use assertiveness tools to increase visibility and confidence**. This includes defining yourself as a chemist with a right to belong in the community and speaking up about what you have to contribute. Some chemists said using positive self-talk strategies helps them build the confidence to share their ideas. They also said staying focused and determined about what they want from their careers is useful.

> **"At this point I feel like I belong but it's through willpower that I've convinced myself I'm right to be here. I've received messages that I don't belong, either overt or unconscious. So it's been about overcoming that messaging for me."**

- **Take self-care seriously**. This includes being aware of the emotional, mental and physical impact of not-belonging, and prioritising the things that help you stay well emotionally and physically.

> **"With my team I know that my ideas will be valued. But it was a different situation when I was doing my PhD and it led to a mental health crisis for me. I chose to stay but I know people who have left because of not-belonging."**

- **Reframing not belonging**. This includes recognising that not-belonging is rarely a permanent state, and feelings of not-belonging may lessen over time. Research from other sources suggests that reframing not-belonging as 'normal' is most effective when it is combined with other approaches such as building connections with peers and mentors.

Reframing not-belonging

A number of studies have shown the impact of an intervention designed to reduce belonging uncertainty amongst college students from minoritised backgrounds. It involves students spending one hour hearing and reflecting on stories from mentors from similar backgrounds, who describe the challenges they faced during the transition to college and how their sense of belonging improved with time.

These stories reframe not-belonging as temporary, and as due to the transition itself, rather than due to being part of a particular group.[13] This helps students build their self-confidence and ability to connect with others, including mentors, which leads to better outcomes in the longer term.

7 Conclusions

Efforts to increase inclusion and diversity must also focus on belonging.
In our view, belonging is a key enabler of inclusion and therefore diversity.

All of the chemists who took part in this study shared experiences of belonging in the chemical sciences, and of not-belonging.
Belonging and not-belonging are universal feelings, but they are not constant. The sense of belonging comes and goes, according to an interplay of factors relating to self, others (peers, colleagues, managers, others) and the wider environment, that is unique to each individual.

Questions of belonging, and experiences of not-belonging, are especially relevant in the lives and careers of groups under-represented in the chemical sciences community.
The stories of not-belonging shared by people in the focus groups on race or ethnicity, disability, being LGBT+ in the chemical sciences and those from people who self-described as being from less privileged socio-economic backgrounds, were particularly powerful.

Building belonging requires that individuals and organisations pay attention to all five enablers of belonging: connection, respect, diversity, inclusion and an intention to belong.
Many of the organisational-level interventions required to increase the sense of belonging for under-represented groups are familiar from the work on inclusion and diversity. But action on belonging needs to pay particular attention to connection and community alongside the fundamentals of respect, inclusion and diversity.

Some part of belonging is about having the intention to belong, but individuals cannot achieve a sense of belonging by themselves.
Individuals can take steps to increase their sense of belonging, but it is clear that belonging cannot be the responsibility of, or under the control of, those who don't belong. Neither can it be about having to adapt, to fit in, to hide oneself, in order to belong.

It is also likely that there is a mutual relationship between and individual's intention to belong and the steps others take to support them to belong. When people experience a community as more welcoming, they find it easier to participate in it and so increase their sense of belonging.

8 Appendix

A: Measuring belonging

There is no single agreed metric or set of metrics for measuring belonging, and as with inclusion, what gets measured will depend on the underlying understanding or model of belonging.

The chemists we spoke to were divided over whether measuring belonging at work is important or not, and ambivalent about how it should be measured.

Those against measuring belonging argued that:

- Belonging is a feeling, an emotional state, so it's hard to measure with any accuracy.
- Belonging is often temporary, highly context-dependent, shifting from day-to-day. Measuring belonging will only ever provide a snapshot of the sense of belonging of an individual or group.

Those in favour of measuring belonging argued that:

- Everyone can answer questions about belonging and not-belonging.
- Even if feelings are hard to measure, there are easy-to-measure indicators correlating with the sense of belonging. Levels of attendance, retention and engagement provide insights into the sense of belonging of individuals and groups.
- It is essential to understand similarities and differences in the sense of belonging of different demographic groups, as the basis for any action to reduce not-belonging.
- Measuring is important in holding organisations and their managers to account for the sense of belonging of the people who work in them.

For organisations interested in measuring the sense of belonging among their members, available measures include: the General Belongingness Scale[14], the Math Sense of Belonging Scale[7], and the University of Maryland survey of belonging amongst graduate students.[15]

B: Methodology

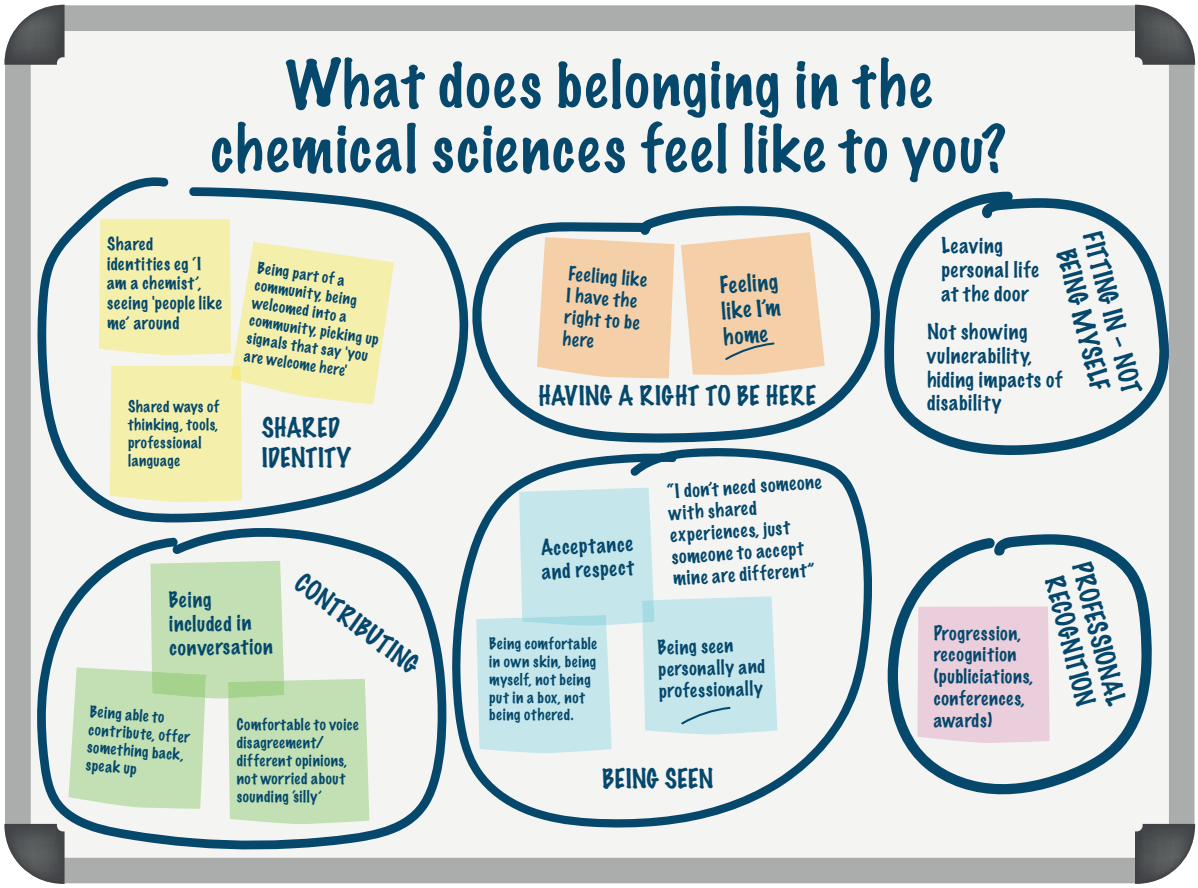
All participants in this qualitative study were chemical scientists invited to take part by the Royal Society of Chemistry Inclusion and Diversity team. Participants were chosen to represent a range of experience and career stage within the chemical sciences, and to give voice to the experiences of different demographic groups.

We held focus groups and one-to-one targeted interviews in spring 2021. The focus groups were structured as follows:

1. PhD students
2. Early career chemists
3. Established chemists
4. Chemists from minoritised ethnic groups
5. LGBT+ chemists
6. Disabled chemists
7. No specific demographic

The interviews and focus groups were conducted by an independent consultant, Sarah Bond, For Business Sake. A member of the Royal Society of Chemistry Inclusion and Diversity team attended each focus group as an observer and note-taker.

Following the interviews and focus groups, a full set of anonymised interviews and focus group notes was collated and discussed with the Inclusion and Diversity team. Initial reflections on key themes were posted on a Google Jamboard, which was then reviewed by the team members.



The collated Jamboards were further reviewed and discussed in a workshop with the Inclusion and Diversity team and the project Advisory Group and key findings and recommendations were subsequently discussed with the RSC Inclusion and Diversity Committee, before the report was finalised in August 2021.

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