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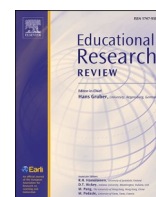
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## Review

# The definition and measurement of sense of belonging in higher education: A systematic literature review with a special focus on students' ethnicity and generation status in higher education<sup>☆</sup>

Aike S. Dias-Broens<sup>\*</sup>, Marieke Meeuwisse, Sabine E. Severiens

Erasmus School of Social and Behavioural Sciences, Department of Psychology, Education, and Child Studies, Erasmus University Rotterdam, Burgemeester Oudlaan 50, 3062PA, Rotterdam, the Netherlands

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## ABSTRACT

Sense of belonging in higher education contributes to students' wellbeing and academic attainment. However, there is ambiguity about the definition and measurement of sense of belonging in higher education, and it is unclear how these definitions and measures are used in diverse student populations in terms of ethnicity and generation status in higher education. In this systematic review we investigated how students' sense of belonging in higher education is defined and measured and how this differs in studies addressing students' ethnicity or generation status in higher education. 89 quantitative, 55 qualitative, and 6 mixed method articles published between 2000 and 2021 were included, critically analyzed through an integrative approach, and their quality was appraised. Results revealed (a) a large variety in underlying concepts used to define sense of belonging in higher education, including additional concepts from qualitative studies, (b) 52 separate used measures, and (c) misalignment between definitions and measures in quantitative studies. There was a substantial difference in cited definitions and used measures between studies that did and did not address students' ethnicity or generation status in higher education. Furthermore, from the findings it is implied to be explicit about the HE context in which sense of belonging is studied or focused on, alongside the deliberate inclusion of students' representative intersecting identities.

Over the last few decades, the composition of the higher education (HE) student population has changed as the number of historically underrepresented students entering HE has grown internationally (UNESCO, 2020). In the United States of America (USA) for example, the relative number of ethnic minority undergraduates increased from 30 percent in 1995–96 to 45 percent in 2015–16 (Espinosa et al., 2019). Similarly, in the Netherlands, the share of ethnic minority students and first-generation students in HE has increased (Ministry of Education, Culture and Science, 2019). Although the accessibility of HE for ethnic minority students and first-generation students seems to have increased, this does not mean that the academic attainment gap is decreasing (Espinosa et al., 2019). Ethnic minority students and first-generation students have a higher risk of lower emotional wellbeing, motivation, and success (or attainment) in HE (Chun et al., 2016; Hausmann et al., 2007, 2009; Lehmann, 2007; Luciano-Wong & Crowe, 2019) due to factors

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<sup>\*</sup> Corresponding author. Erasmus University Rotterdam, Burgemeester Oudlaan 50, 3062, PA Rotterdam, the Netherlands.

E-mail addresses: [dias-broens@essb.eur.nl](mailto:dias-broens@essb.eur.nl) (A.S. Dias-Broens), [meeuwisse@essb.eur.nl](mailto:meeuwisse@essb.eur.nl) (M. Meeuwisse), [sabine.severiens@essb.eur.nl](mailto:sabine.severiens@essb.eur.nl) (S.E. Severiens).

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such as financial stress, discrimination, and isolation on campus (Carales & Nora, 2020; Gillen-O'Neel, 2021; Pérez Huber & Solorzano, 2015; Vaccaro & Newman, 2016).

Ethnic minority students and first-generation students are examples of social identity groups who are historically underrepresented in HE (Harper, 2013; Vaccaro & Newman, 2016). "Ethnicity" refers to a particular ethnic group with a shared culture, language, history, and shared traditions (Cambridge University Press, n.d.b). Being an ethnic minority student means that within the country of the HE institution that a student attends, most people have a different ethnicity than the student in question (Cambridge University Press, n.d.a). "Generation status in HE" describes whether a student has at least one parent who completed a HE degree, and if not, the student belongs to the first generation within the family to go to HE (i.e., the student is a first-generation student; Stebleton et al., 2014).

To improve the success of *all* students, one must take a closer look at crucial factors within the HE context. Students' sense of belonging was found to be positively related to emotional wellbeing, academic motivation, and success in HE (Chun et al., 2016; Pittman & Richmond, 2008; Thomas, 2012; van der Zanden et al., 2018; Won et al., 2018; Zumbunn et al., 2014). Sense of belonging is a fundamental human need (Baumeister & Leary, 1995) and is often referred to as "the experience of personal involvement in a system or environment so that persons feel themselves to be an integral part of that system or environment" (Hagerty et al., 1992, p. 173). According to Strayhorn (2019), the need for sense of belonging takes on heightened importance in (a) contexts someone experiences as foreign, unknown, or dissimilar, (b) developmental phases that are challenging or where an individual is extra vulnerable, such as (late) adolescence, and (c) contexts in which specific individuals are prone to feel marginalized or unwelcomed (Anderman & Freeman, 2004; Maslow, 1962; Strayhorn, 2019). It is worrisome that studies have shown that ethnic minority students and first-generation students feel a lower sense of belonging in HE compared to their overrepresented peers (Gopalan & Brady, 2020; Hausmann et al., 2009; Ostrove & Long, 2007; Stebleton et al., 2014). The three points (a-c) that Strayhorn (2019) mentioned in relation to sense of belonging could explain these results. Earlier research showed that ethnic minority and first-generation students are more likely to experience HE as foreign or unknown, feel marginalized, and are extra vulnerable due to discrimination or alienation for example (Carales & Nora, 2020; Gillen-O'Neel, 2021; Pérez Huber & Solorzano, 2015; Strayhorn, 2019).

When we take a closer look at the existing literature about students' sense of belonging in HE, there is ambiguity about the definition and measurement of sense of belonging in HE (Ribera et al., 2017; Slaten et al., 2018). Therefore, the goal of this study is to systematically review the literature that discusses the definition and measurement of students' sense of belonging in HE, with a specific focus on literature that takes students' ethnicity and students' generation status in HE into account.

## 1. Ambiguity about the definition and measurement of sense of belonging in HE

Given the importance of sense of belonging in HE for student success (Hausmann et al., 2009; Naylor et al., 2018; van Gijn-Grosvenor & Huisman, 2020), it is remarkable that, on a phenomenological level, there is ambiguity about the definition and operationalization of students' sense of belonging in HE in general, according to Slaten et al. (2018). This means that there is no consensus in the literature about how students' sense of belonging in HE should be defined and measured. Hausmann et al. (2007), for example, defined students' sense of belonging in HE as "the psychological sense that one is a valued member of the college community" (p. 804). Another example, from Strayhorn (2019), is "students' perceived social support on campus, a feeling of sensation or connectedness, and the experience of mattering or feeling cared about, accepted, respected, valued by, and important to the campus community or others on campus such as faculty, staff, and peers" (p. 4). In these definitions, differences can be found in the extent to which dimensions of psychological and/or emotional experiences, and who is involved, are explicated. Variation can also be found in the operationalization of sense of belonging in HE into single- and multifactor measures (Dumford et al., 2019; Gummadam et al., 2016; Knekta et al., 2020). Single-factor instruments measuring sense of belonging in HE vary from using one item (Glencross et al., 2019) to three (Bollen & Hoyle, 1990) or six items (Meeuwisse et al., 2010). Multiple-factor models vary from using 6–14 items within a two-factor model (Fink et al., 2020; Freeman et al., 2007) to 18–26 items within a three- or four-factor model (Good et al., 2012; Goodenow, 1993; Walton & Cohen, 2011).

## 2. Consequences of ambiguity about sense of belonging in HE

Due to the variety in definitions and operationalizations of sense of belonging in HE, the problem arises that the existing studies' results or effects regarding students' sense of belonging in HE are hard to interpret and position. When one study, using a three-item measure for sense of belonging, finds that first-generation students experience a similar sense of belonging in HE compared to continuing-generation students (Gillen-O'Neel, 2021), but another study, using the adapted 18-item Psychological Sense of School Membership (PSSM) measure, finds that first-generation students experience a lower sense of belonging in HE (Goodenow, 1993; Pittman & Richmond, 2007), how should this be interpreted? Are these measures addressing the same thing? Moreover, if results would be used to create impact, it is unclear what an educational goal such as "improving the sense of belonging of all students in HE" means. Sense of belonging could entail peer relationships (Ribera et al., 2017), comfort (within the major and/or the campus community; Crowe, 2021; Hoffman et al., 2002), respect (in general and/or by faculty members; Pittman & Richmond, 2008; Seyitoğlu & Çevik, 2016), university affiliation (Slaten et al., 2018), and so on.

To create more clarity on how to understand and interpret students' sense of belonging in the HE context, a comprehensive overview is needed of the definition and operationalization of this construct. Although Ribera et al. (2017) created a short overview of existing measures of belonging in HE, a comprehensive overview, that is a meta-analysis or systematic literature review about students' sense of belonging in HE, does not seem to exist (Allen et al., 2018; Chen & Zhou, 2019; Mahar et al., 2013). Existing

meta-analyses or reviews on sense of belonging either look at (a) the broad definition of sense of belonging without specifying a context in terms of environment or population (Mahar et al., 2013), (b) sense of belonging outcomes in secondary education (Allen et al., 2018), or (c) specific demarcated elements within the HE context such as the sense of belonging of Chinese international students only (Chen & Zhou, 2019). In conclusion, the discussion of the existing meta-analyses and reviews shows a clear added value of a review focused on (all) students' definitions and measures of sense of belonging in the HE context (Allen et al., 2018; Chen & Zhou, 2019; Mahar et al., 2013).

Given the heightened importance of sense of belonging as a fundamental need in the HE context (Strayhorn, 2019), and the need for clarity about the definition and understanding of what is being measured as sense of belonging in HE, this study presents a systematic literature review to answer the following research question: "How is the sense of belonging of students in HE defined and measured (research question 1 (RQ1))?"

### 3. Students' ethnicity and generation status in HE

To improve ethnic minority and first-generation students' sense of belonging in HE, several interventions were developed and studied (Middleton et al., 2021; Solanki et al., 2020; Walton & Cohen, 2011). However, the instruments used to measure the development of sense of belonging during such interventions were developed within a predominantly White sample, and no measurement invariance testing was done on relevant student background indicators such as ethnicity and generation status in HE (Bollen & Hoyle, 1990; Hoffman et al., 2002; Slaten et al., 2018). This has implications for the validity and interpretation of the measured impact of sense of belonging interventions. The composition of the HE student population in terms of ethnicity and generation status in HE has changed in recent decades, but the current definitions and measures of students' sense of belonging in HE have not been studied and (if necessary) updated for validity in this changed population. Therefore, the second question answered in this review is, "How do the definitions and measures of sense of belonging in HE differ in studies addressing students' ethnicity and generation status in HE compared to studies not addressing these student background indicators (research question 2 (RQ2))?"

## 4. Method

As preregistered with the open science framework (OSF; <https://osf.io/u9afn>), we conducted a systematic literature review on the definition and measurement of students' sense of belonging in HE. We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Liberati et al., 2009) guidelines. To acquire the level of depth that we think sense of belonging in HE needs (and deserves), we aimed for a holistic synthesis of the existing definitions and measures in the literature by using an integrative approach within this review (Torraco, 2005).

### 4.1. Literature search and selection

We conducted the literature search in three stages (Fig. 1): identification, screening, and eligibility (Liberati et al., 2009). To identify literature, we searched the databases ERIC ProQuest, Sociological Abstracts ProQuest, Web of Science, PsycINFO, and Scopus in February 2021, and we contacted 14 international experts on the topic of sense of belonging in HE to make sure no key articles were missing. Nine experts were part of the authors' own (inter)national network, four experts were experienced researchers with published articles on sense of belonging in HE, and one expert was referred to us by another expert. The search query we used for the databases included three categories of key concepts: (A) Belonging, (B) Higher Education, and (C) Student (for the full search terms set, see Fig. 1). Simultaneously, seven of the contacted international experts responded to our request and identified 18 unique sources that, according to their expertise, needed to be included in our review. The inclusion criteria used in the identification stage were that studies were required to be (I) scholarly, peer-reviewed articles; (II) published in 2000 or later; and (III) published in English. We chose to include quantitative, qualitative, and mixed method studies. The quantitative studies were the basis of this review, as they included both definitions and measures of sense of belonging in HE. Input from qualitative studies (i.e., directly from students) was deemed supplementary to make sure that students' own definitions of sense of belonging in HE were also included.

The results from the search query in the identification stage (N = 6126) were exported to check for duplicates. After the duplicates were removed, the final number of articles for the screening stage was determined (N = 3323; Fig. 1). The articles were exported to the web-app Rayyan (Ouzzani et al., 2016) for further review. To answer RQ1, we reviewed the literature in two stages: (1) the screening of titles and abstracts (screening stage), and (2) the full-text assessment (eligibility stage).

First, to determine potentially relevant articles, we screened titles and abstracts using the following inclusion criteria (Fig. 1): the selected articles were required to (IV) study sense of belonging in the physical/on-campus HE context, and (V) use data collected from students directly or contain studies that used data collected from students directly. Articles were excluded (VI) when the sample only consisted of: (1) international students; or (2) students with a specific need or background indicator that we deemed determinative in influencing their sense of belonging other than ethnicity and generation status in HE (including mature, part-time, and neurodivergent students, as well as students with severe mental wellbeing challenges, recent immigrants or refugees, student athletes, and students who transferred after the start of their course). The screening of titles and abstracts resulted in 511 articles remaining (Fig. 1).

Second, in the eligibility stage, we assessed the full text of the relevant articles, after which 150 articles remained (Fig. 1). Both quantitative and qualitative studies were included, and in the full-text assessment we made a distinction between inclusion criteria that were relevant for all studies and inclusion criteria that were relevant solely for quantitative or qualitative studies (Fig. 1). In line with our research goal for RQ1, the selected quantitative studies were required to (VII) give an existing definition of sense of belonging in

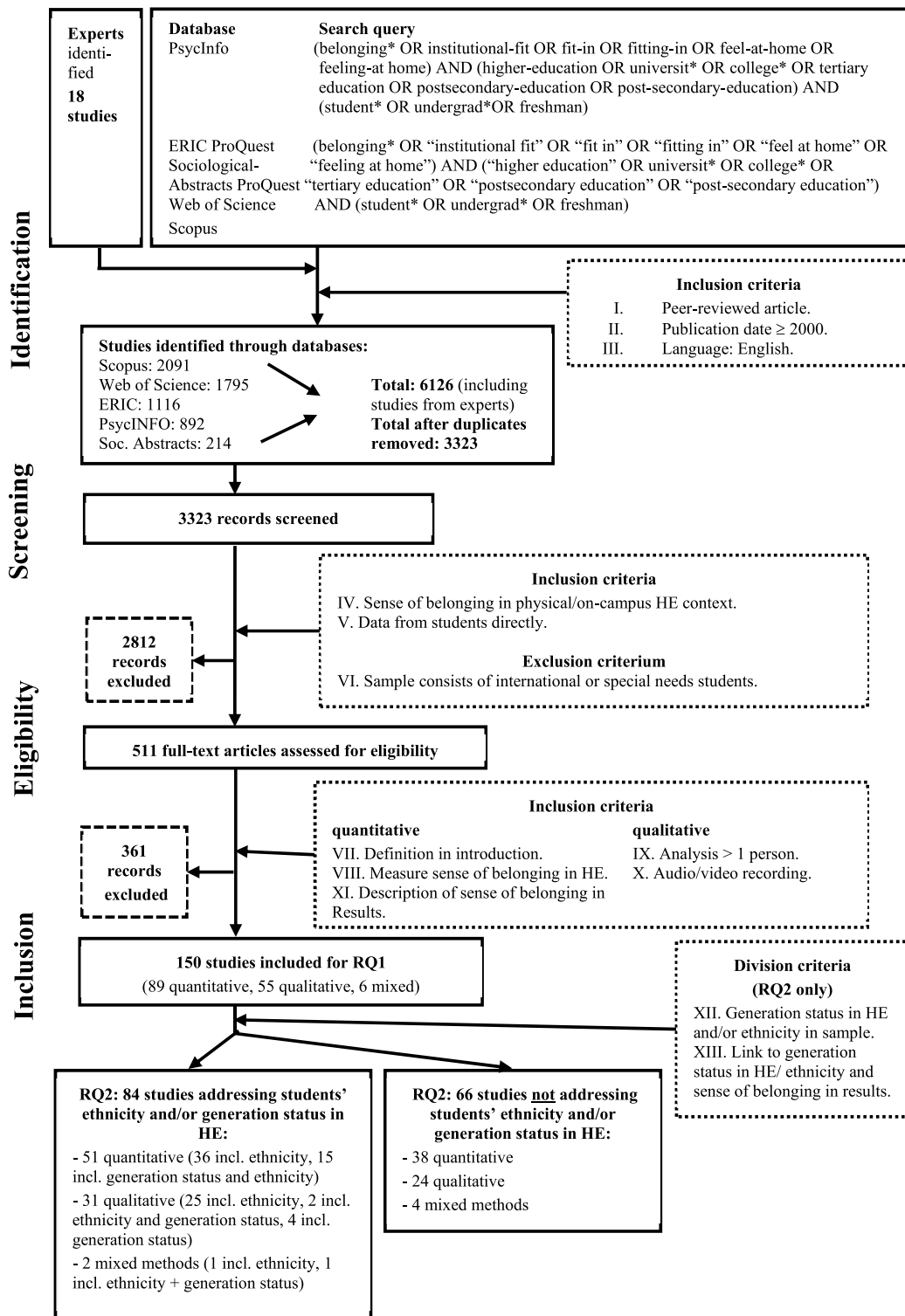


Fig. 1. Flowchart for study identification, screening, eligibility and inclusion (Liberati et al., 2009; Wallin et al., 2019).

HE in the introduction and/or theoretical framework with a referenced author and (VIII) include information about the operationalization of sense of belonging, i.e., a reference to an existing measure was needed, or, when there were adaptations or the instrument was developed by the authors themselves, the items needed to be listed or sent by the authors when requested by us. The selected qualitative studies in the eligibility stage were required to (IX) mention that the analysis of the data was done by at least two persons,

(X) mention that video or audio recordings were made in case of interviews or include sections of transcripts, and (XI) include information about how students themselves described sense of belonging in HE in the results section. The identified sources from the international experts were either already included through the database searches or failed to meet one or more of the inclusion criteria. One article was from a journal that was not indexed in the five databases used in this review. Therefore, no articles recommended by experts were added.

To answer RQ2, we made a division between studies that did and did not address students' ethnicity and/or generation status in HE. By 'address' we mean that studies paid explicit (but not sole) attention to either one of these two background indicators in their sample, and in their results when discussing sense of belonging in HE. The studies placed in the group that addressed students' ethnicity and/or generation status in HE were required to (XII) describe background indicators of the participants, including a description of the composition of the sample in terms of ethnicity and generation status in HE and (XIII) give information in the results on students' ethnicity and generation status when reporting on sense of belonging. We found that 84 studies could be placed in the group of studies that addressed students' ethnicity and/or generation status, and 66 were placed in the other group (Fig. 1).

The first and second authors performed the screening of abstracts and titles to ensure a reliable procedure was followed. To minimize the risk of reviewer bias, both reviewers screened the articles by using the "blinds on" setting in Rayyan (Ouzzani et al., 2016), and the reviewers met to discuss any differences afterwards. Hereafter, as the most rigorous screening of studies was done, the first author continued with the eligibility stages and consulted the second and third authors about uncertainties (Centre for Reviews and Dissemination, 2009).

#### 4.2. Positionality statement

Our research team comprises of three White women; two are faculty members and one is a PhD student in the department of Psychology, Education and Child Studies. Two identified as first-generation students when they were studying in HE, and one identified as continuing generation student. We all study and teach subjects on equity in education and are advocates for the inclusion of different perspectives and experiences in our teaching and research. The paradigm that we identified most with during this study was post positivism (Guba & Lincoln, 1994). We mainly analyzed quantitative studies in this review; however, we deliberately complemented the quantitative information regarding the definitions of sense of belonging in HE with qualitative results. We value, analyze, and reflect on the meaning and consequences of these qualitative results in the discussion. We put in place 'external guardians' of objectivity (Guba & Lincoln, 1994) as we recognize our positionality might have influenced our undertakings. Examples of such external guardians are that we involved experts in selecting literature, we performed the screening of articles with two people, and we used a quality appraisal. Input from qualitative studies was also an external guardian that we used to examine the fit between the sense of belonging definitions in quantitative work and the definitions from students directly.

#### 4.3. Quality appraisal of the included studies

After we finalized the inclusion of the selected articles, we assessed the quality of each study. Inspired by the Quality Assessment Tool for Studies with Diverse Designs (QATSDD) by Sirriyeh et al. (2012), we developed a quality appraisal tool which included six criteria that were scored insufficient (0) or sufficient (1). The first three criteria were used for quantitative studies included for RQ1. The three criteria focused on (a) the extensiveness of the theoretical basis of sense of belonging in HE, (b) the reporting of the reliability of the measure, and (c) the fit between the "sense of belonging in HE definition" and the "sense of belonging in HE measure". The fourth and fifth criteria were used for qualitative studies included for RQ1 and focused on (d) the extensiveness of information in the method section and (e) the reporting of the reliability-analysis of the results. Finally, the sixth criterion was used for studies that addressed students' ethnicity and/or generation status in HE (for RQ2) and focused on (f) the extent to which there was information about whether the sample resembled the studied target population in terms of "ethnicity" and "generation status in HE", and if we deemed this resemblance sufficient.

#### 4.4. Analysis

We conducted an integrative approach to analyze all the information on the definition and measurement of sense of belonging in HE in the included studies, given the usefulness of this approach for the synthesis a body of knowledge. After we determined the quality of the included studies via our quality appraisal, we continued with the integrative approach by conducting a content analysis in the following steps (Torraco, 2005). First, we extracted the information regarding the used definitions and instruments measuring sense of belonging from the quantitative and qualitative studies. To remain as objective as possible in this stage, only information from the literal definition of sense of belonging in HE that the authors used in their introduction in quantitative studies was extracted and further analyzed.

Second, to answer the definitions-section of RQ1, we developed a concept matrix (see Table 1) listing all the concepts that were used in these definitions of sense of belonging in HE in the quantitative studies, supplemented with additional concepts that were mentioned in the qualitative studies only. These additional concepts were determined by the authors through coding the relevant sections of the results of the qualitative studies in Atlas.ti (2022) in seven steps. First, the first author developed a list with all the underlying concepts and their descriptions in the sense of belonging definitions used in quantitative studies. Second, she highlighted all the sections in the results of the included qualitative studies where sense of belonging was defined by students. Third, the first author determined what underlying concepts should be added to the list based on the highlighted sections in the qualitative papers.

**Table 1**  
Concept matrix sense of belonging in higher education from quantitative, qualitative, and mixed method studies.

1. Concepts found five times or more in quantitative studies	2. Concepts from qualitative studies not found in quantitative studies	3. Quantitative papers that mentioned the listed concept <sup>a</sup>	4. Mixed method papers that mentioned the listed concept <sup>a</sup>	5. # mentioned in quantitative studies (RQ1,RQ2) <sup>b</sup>	6. Qualitative or mixed method papers that mentioned an additional concept <sup>d</sup>
1. Acceptance	–	3,7,11 <sup>a</sup> ,12 <sup>a</sup> ,14 <sup>a</sup> ,16,31 <sup>a</sup> ,34 <sup>a</sup> ,40,46 <sup>a</sup> ,47 <sup>a</sup> ,65 <sup>a</sup> ,69,73,74,76,83,88 <sup>a</sup> ,94,95 <sup>a</sup> ,96 <sup>a</sup> ,100 <sup>a</sup> ,103 <sup>a</sup> ,105,107 <sup>a</sup> ,108 <sup>a</sup> ,110 <sup>a</sup> ,116 <sup>a</sup> ,117,122 <sup>a</sup> ,125,126,145,152,155,156,158	37 <sup>a</sup> ,135,153,159	41; 19 <sup>a</sup>	–
2. Connectedness	–	7,11 <sup>a</sup> ,12 <sup>a</sup> ,24,29,30,33 <sup>a</sup> ,34 <sup>a</sup> ,35 <sup>a</sup> ,39 <sup>a</sup> ,41,42,58 <sup>a</sup> ,61 <sup>a</sup> ,62 <sup>a</sup> ,63 <sup>a</sup> ,65 <sup>a</sup> ,74,81 <sup>a</sup> ,87 <sup>a</sup> ,94,97,98 <sup>a</sup> ,100 <sup>a</sup> ,107 <sup>a</sup> ,108 <sup>a</sup> ,110 <sup>a</sup> ,112 <sup>a</sup> ,113,117,126,127,130 <sup>a</sup> ,131,138 <sup>a</sup> ,139 <sup>a</sup> ,151 <sup>a</sup>	37 <sup>a</sup> ,77,153	40; 24 <sup>a</sup>	–
3. Support	–	2,3,7,11 <sup>a</sup> ,12 <sup>a</sup> ,16,30 <sup>a</sup> ,33 <sup>a</sup> ,34 <sup>a</sup> ,41,48,61 <sup>a</sup> ,65 <sup>a</sup> ,69,73,74,83,100 <sup>a</sup> ,105,107 <sup>a</sup> ,110 <sup>a</sup> ,121,125,126,130 <sup>a</sup> ,139 <sup>a</sup> ,150,151 <sup>a</sup> ,155,156,158	37 <sup>a</sup> ,135,159	34; 14 <sup>a</sup>	–
4. Valuation	–	7,11 <sup>a</sup> ,12 <sup>a</sup> ,17 <sup>a</sup> ,34 <sup>a</sup> ,40,53 <sup>a</sup> ,65 <sup>a</sup> ,74,76,82,88 <sup>a</sup> ,95 <sup>a</sup> ,96 <sup>a</sup> ,100 <sup>a</sup> ,105,107 <sup>a</sup> ,110 <sup>a</sup> ,117,122 <sup>a</sup> ,126,127,134 <sup>a</sup> ,140,144 <sup>a</sup> ,155	37 <sup>a</sup>	27; 16 <sup>a</sup>	–
5. Respect	–	7,11 <sup>a</sup> ,12 <sup>a</sup> ,17 <sup>a</sup> ,34 <sup>a</sup> ,40,47 <sup>a</sup> ,65 <sup>a</sup> ,69,73,74,83,88 <sup>a</sup> ,100 <sup>a</sup> ,105,107 <sup>a</sup> ,110 <sup>a</sup> ,117,121,125,126,144 <sup>a</sup> ,158	37 <sup>a</sup> ,135	25; 12 <sup>a</sup>	–
6. Inclusion	–	3,35 <sup>a</sup> ,47 <sup>a</sup> ,64 <sup>a</sup> ,69,73,76,80,82,83,88 <sup>a</sup> ,94,105,121,122 <sup>a</sup> ,152,158	135	18; 5 <sup>a</sup>	–
7. Importance	–	12 <sup>a</sup> ,34 <sup>a</sup> ,46 <sup>a</sup> ,65 <sup>a</sup> ,74,100 <sup>a</sup> ,105,110 <sup>a</sup> ,117,122 <sup>a</sup> ,126,139,151 <sup>a</sup> ,155,156	37 <sup>a</sup> ,77	17; 9 <sup>a</sup>	–
8. Mattering	–	11 <sup>a</sup> ,12 <sup>a</sup> ,24,33 <sup>a</sup> ,34 <sup>a</sup> ,65 <sup>a</sup> ,74,97,100 <sup>a</sup> ,107 <sup>a</sup> ,110 <sup>a</sup> ,117,126,130 <sup>a</sup> ,139 <sup>a</sup>	37 <sup>a</sup>	16; 11 <sup>a</sup>	–
9. Being/feeling a part of	–	7,29 <sup>a</sup> ,30 <sup>a</sup> ,59 <sup>a</sup> ,81 <sup>a</sup> ,85 <sup>a</sup> ,87 <sup>a</sup> ,117,133 <sup>a</sup> ,138 <sup>a</sup> ,140,155,156	–	13; 8 <sup>a</sup>	–
10. Fitting in	–	14 <sup>a</sup> ,24,43 <sup>a</sup> ,82,86,93 <sup>a</sup> ,112 <sup>a</sup> ,113,122 <sup>a</sup> ,150,152	–	11; 5 <sup>a</sup>	–
11. Integration	–	42,57,58 <sup>a</sup> ,64 <sup>a</sup> ,87 <sup>a</sup> ,131,132 <sup>a</sup> ,145	–	8; 4 <sup>a</sup>	–
12. Membership	–	85 <sup>a</sup> ,87 <sup>a</sup> ,103 <sup>a</sup> ,112 <sup>a</sup> ,113,150	–	6; 4 <sup>a</sup>	–
13. Sense of affiliation	–	50,54 <sup>a</sup> ,57,62 <sup>a</sup> ,78	38 <sup>a</sup>	6; 3 <sup>a</sup>	–
14. Sense of identification	–	50,54 <sup>a</sup> ,57,62 <sup>a</sup> ,63 <sup>a</sup>	–	5; 3 <sup>a</sup>	–
15. Social relations	–	30 <sup>a</sup> ,31 <sup>a</sup> ,35 <sup>a</sup> ,116 <sup>a</sup> ,127	–	5; 4 <sup>a</sup>	–
–	Being tolerated	–	–	–	Agllias et al. (2016), Garvey et al. (2018) <sup>a</sup>
–	Being yourself	–	–	–	Garvey et al. (2018) <sup>a</sup> , Scanlon et al. (2020), Stebleton and Aleixo (2016) <sup>a</sup> , Tachine et al. (2017) <sup>a</sup> , Vaccaro and Newman (2016), Vaccaro and Newman (2017) <sup>a</sup>
–	Experience coherence	–	–	–	Dingel and Sage (2021) <sup>a</sup> , Kember et al. (2008), Kember et al. (2011)
–	Experience diversity	–	–	–	Bettencourt (2021) <sup>a</sup> , Daniels et al. (2021) <sup>a</sup> , Duran (2018) <sup>a</sup> , Lester et al. (2013), Stebleton and Aleixo (2016) <sup>a</sup>

(continued on next page)

Table 1 (continued)

1. Concepts found five times or more in quantitative studies	2. Concepts from qualitative studies not found in quantitative studies	3. Quantitative papers that mentioned the listed concept <sup>a</sup>	4. Mixed method papers that mentioned the listed concept <sup>a</sup>	5. # mentioned in quantitative studies (RQ1,RQ2) <sup>b</sup>	6. Qualitative or mixed method papers that mentioned an additional concept <sup>a</sup>
-	Feeling capable	-		-	Bradbury and Mather (2009) <sup>a</sup> , Korhonen et al. (2017), Picton et al. (2018), Tachine et al. (2017) <sup>a</sup>
-	Feeling recognized or acknowledged	-		-	Duran (2018) <sup>a</sup> , McBeath et al. (2018), Means and Pyne (2017) <sup>a</sup>
-	Feeling safe	-		-	Couture et al. (2021) <sup>a</sup> , Guyotte et al. (2021) <sup>a</sup> , Means and Pyne (2017) <sup>a</sup> , O'Sullivan et al. (2019), Vaccaro and Newman (2016), Vaccaro and Newman (2017) <sup>a</sup>
	Feeling similar/ experience similarities	-		-	Alejandro et al. (2020) <sup>a</sup> , McCall and Castles (2020) <sup>a</sup> , McCall and Castles (2020) <sup>a</sup> , Duran (2018) <sup>a</sup> , Garriott et al. (2019) <sup>a</sup> , Hammond et al. (2019) <sup>a</sup> , Llamas et al. (2020) <sup>a</sup> , McCall and Castles (2020) <sup>a</sup> , Rohde et al. (2019) <sup>a</sup> , Schussler and Fierros (2008), Stebleton and Aleixo (2016) <sup>a</sup> , Vaccaro and Newman (2017) <sup>a</sup>
	Self-investment	-		-	Brooms (2019) <sup>a</sup> , Daniels et al. (2021) <sup>a</sup>
	Wanting to contribute	-		-	Bettencourt (2021) <sup>a</sup> , Daniels et al. (2021) <sup>a</sup> , Duran (2018) <sup>a</sup>

Note. The numbers in columns 3, 4 and 6 are the numbers that are connected to the included papers in the reference list, and that papers can be identified with.

<sup>a</sup> This paper contained information regarding students' ethnicity or generation status in HE.

<sup>b</sup> The numbers in column 5 are a count of the number of papers that are mentioned in quantitative studies.



Fourth, all three authors discussed if and how the added underlying concepts were different from the existing underlying concepts in the list and came to an agreement. Fifth, the first and second author independently coded the sections of three articles which they thought included concepts that were not mentioned in the quantitative studies. Sixth, the independent codes were discussed between the two authors. Once they reached agreement, the seventh step included the coding of the remaining articles by the first and second author independently. After comparing the remaining coding, complete agreement was determined.

To answer the measures-section of RQ1, we listed all the sense of belonging instruments that were named and used in the quantitative studies in [Table 2](#), including information regarding dimensionality, psychometric properties, entities (such as peers and staff), the instrument addressed, and the HE context in which the sense of belonging items were placed. If there was no reference to an existing measure by the authors or if an existing sense of belonging in HE instrument was renamed and adapted by the authors, we listed the instrument as a separate instrument.

To answer RQ2, we compared and analyzed how studies that did, and studies that did not address students' ethnicity or generation status in HE, defined and measured sense of belonging in HE, and the most notable differences were further discussed. Afterwards, for RQ1 and RQ2, we conducted a critical analysis of both the quality and the content of all the included definitions and measures, resulting in the identification of strengths and deficiencies of the literature. Finally, in order to reach the intended level of depth for an integrative approach, and to reach our research goals, we synthesized the body of knowledge about students' sense of belonging in HE ([Torraco, 2005](#)), as presented in the discussion section. We generated our perspective on the definition and measurement of sense of belonging in the HE context as a first foundational step to classify the underlying concepts of this construct.

## 5. Results

### 5.1. The definition of sense of belonging in HE

The concepts mentioned most often ( $\geq 10$  times) in the definitions of sense of belonging in HE (RQ1) in quantitative and mixed method studies were acceptance, connectedness, support, valuation, respect, inclusion, importance, mattering, being or feeling a part of, and fitting in ([Table 1](#)). The most cited authors in connection to the used definition of sense of belonging in HE were [Strayhorn \(2012, 2019; cited 19 times\)](#), [Goodenow \(1993; cited 18 times\)](#), and [Hurtado and Carter \(1997; cited 16 times\)](#). [Strayhorn \(2012, 2019\)](#) used a broad definition, including the concepts "support", "connectedness", "mattering", "acceptance", "respect", "valuation", and "importance". In terms of social entities a student can feel sense of belonging to and the context in which sense of belonging is placed, [Strayhorn](#) mentioned the campus (community), faculty, staff, and peers in relation to six of the seven concepts; "connectedness" was not contextualized or linked to an entity ([Strayhorn, 2019](#)). Compared to [Strayhorn \(2019\)](#), the definitions of [Goodenow \(1993\)](#) and [Hurtado and Carter \(1997\)](#) are less broad in the mentioned concepts, social entities, and contexts. In her sense of belonging in HE definition, [Goodenow \(1993\)](#) included the concepts "acceptance", "inclusion", and "support". [Hurtado and Carter \(1997\)](#) defined sense of belonging in HE with the concepts "identification", "affiliation", and "connectedness". Both [Goodenow \(1993\)](#) and [Hurtado and Carter \(1997\)](#) specifically mentioned the college community or a group with regards to what or whom a student feels sense of belonging to (e.g., teachers or peers). In terms of the context in which sense of belonging was placed (e.g., the classroom, major, campus, or institution), [Goodenow's](#) original definition of sense of belonging was focused on the school social environment. [Hurtado and Carter \(1997\)](#) did not specify a context in their definition of sense of belonging. In conclusion, the level of specificity of the concepts, social entities, and contexts within the used definitions of sense of belonging in HE differed greatly between the most cited authors.

Next to the concepts described in the quantitative and mixed method studies, additional concepts of sense of belonging in HE emerged from the analysis of the results from qualitative studies (see [Table 1](#)). Within these additional concepts, there is a focus on what a student "brings" to HE or "gets" from it in relation to their education. This is reflected by the concepts "feeling capable", "self-investment", and "wanting to contribute" (as illustrated by [Knekt and McCartney \(2021\)](#); see the appendix for the related quote). In addition to the focus on what a student brings to or gets from HE, concepts from qualitative studies revealed a focus on experiencing diversity and similarities or feeling similar to others (as illustrated in [Daniels et al. \(2021\)](#) and [Duran \(2018\)](#); see the appendix).

### 5.2. The measures of sense of belonging in HE

In this section, the measures of sense of belonging in HE are described in answer to RQ1. This section only includes information from 89 quantitative studies and the quantitative section of six mixed method studies (thus 95 quantitative studies in total, see [Fig. 1](#)).

One of the most striking results of this review is that within the 95 quantitative studies that were included, 52 separate instruments were used to measure sense of belonging in HE ([Table 2](#)). Almost three quarters of the measures were used in one article only. The (adapted) Perceived Cohesion Scale (PCS; [Bollen & Hoyle, 1990](#); [Hurtado & Carter, 1997](#)), the (adapted) Psychological Sense of School Membership Scale (PSSM; [Goodenow, 1993](#); [Pittman & Richmond, 2008](#)), and the Sense of Belonging Instrument ([Hoffman et al., 2002](#)) were used most often (see [Table 2](#)).

Most of the sense of belonging in HE measures were unidimensional or had a unidimensional version ([Table 2](#)). The number of items used in unidimensional measures varied greatly, ranging from single-item measures ([Glencross et al., 2019](#); [Hall et al., 2020](#)) to 18-item measures ([Aelenei et al., 2019](#)). A small number of sense of belonging in HE measures were multidimensional and contained six ([Fink et al., 2020](#)) to 32 items ([Johnson et al., 2020](#)). Multidimensional measures varied in the content of the used factors: factor divisions were based on entities one can feel sense of belonging to (e.g., peers or faculty), the context (e.g., classroom or major), or underlying concepts such as those in [Table 1](#) (e.g., motivation, membership, and acceptance; see [Tables 1 and 2](#)).

**Table 2**

Measures of sense of belonging in higher education.

A. Name measure	B. Created by (year)	C. Used in (year) – (a = adapted)	D. Location	E. Unidimensional (U)/ Multidimensional (M)	F. Factors	G. # items	H. $\alpha$	I. Psychometric information <sup>a</sup>	J. Entity mentioned in items <sup>b</sup>	K. HE context mentioned in items <sup>c</sup>	L. Eligible for RQ2?		
1. Perceived Cohesion Scale (PCS; Sense of Belonging dimension only)	Bollen and Hoyle (1990)	40-Gizir (2019);	40-TR	U	–	3	40: 0.95	–		CC	I/C	53, 54, 59, 81, 85, 87, 107, 134	
		53-Hausmann et al. (2007);	53-US										53: 0.89–0.93
		54-Hausmann et al. (2009);	54- US										54: 0.94
		59-Hurtado et al. (2007) – a;	59- US										59: 0.84
		81-Lewis et al. (2021);	81- US										81: 0.94
		85-Locks et al. (2008);	85- US										85: 0.91
		87-Maestas et al. (2007);	87- US										87: 0.90
		107-Oxendine et al. (2020);	107- US										107: 0.89
		134-Spanierman et al. (2013);	134-US										134: 0.96
		2. PCS-adapted: Sense of Social Cohesion within the College Environment	Hurtado and Carter (1997)	17-Carales and Nora (2020);									US
21-Chun et al. (2016);					4 (41)								
41-Glass and Westmont (2014) – a;					5								
101-Nuñez (2009a) – a;					101; (101; 102)								
102-Nuñez (2009b) – a					41: 0.82								
					101: 0.88								
3. Psychological Sense of School Membership Scale (PSSM)	Goodenow (1993)	3-Aelenei et al. (2019) – a;	3Duran (2018)-FR	U	1. Valued competence (74) 2. Social acceptance (74)	18	3: 0.88	3,73,83,140, 158: X	P F	I/C	–		
		73-Kennedy and Tuckman(2013) – a;	73-US	M (74)								7 (3)	
		74-Knekta t al. (2020) – a;	74-US									11	
		83-Li et al. (2020) – a;	83-CN									74 (74)	
		125-Seyitoğlu and Çevik (2016) -a;	125-TR									4	
		140-Suhlmann et al. (2018) – a;	140-DE									74: 0.90 + .89	
		158-Zhang et al. (2018);	158-CN									12	
		159-Zumbrunn et al. (2014) – a	159-US									83: 0.84	
												20	
												125: 0.71 (159)	

(continued on next page)

Table 2 (continued)

A. Name measure	B. Created by (year)	C. Used in (year) – (a = adapted)	D. Location	E. Unidimensional (U)/ Multidimensional (M)	F. Factors	G. # items	H. $\alpha$	I. Psychometric information <sup>a</sup>	J. Entity mentioned in items <sup>b</sup>	K. HE context mentioned in items <sup>c</sup>	L. Eligible for RQ2?
4. PSSM – adapted	112- Pittman and Richmond (2007)	47 Gummadam et al. (2016); 112- Pittman and Richmond (2007) 113 Pittman and Richmond (2008); 121 Saroughi and Kitsantas (2021)	US	U	–	18 13 (121)	47: 0.87 - 0.89 112: 0.88 113: 0.91 - 0.97 121: 0.89	47: X 112: EFA with PCA – items loaded on not identical factors but meaningful cross-loadings and strong factor correlations – therefore unidimensional. 113: X 121: CFA – 5 items deleted	P F	I/C	47 + 112
5. Sense of Belonging Instrument	57- Hoffman et al. (2002)	2-Ackermann and Morrow (2007); 57- Hoffman et al. (2002)  97-Morrow and Ackermann (2012); 110-Pichon (2016);  130-Solanki et al. (2019) – a	US	M	1. Perceived peer support 2. Perceived faculty support/comfort (not included in 130) 3. Perceived classroom comfort (not included in 130) 4. Perceived isolation (not included in 130) 5. Empathetic faculty understanding (not included in 2, 97, 130)	26 8 (130)	2: 0.91 + .86 + 0.94 + .83 57: 0.87 + 0.87 + 0.90 + .82 + 0.85  97: 0.89-0.92  110: 0.90 + .85 + 0.94 + .83 + 0.86 130: 0.85	2: X 57: focus groups, EFA for student/peer measure and student/faculty measure, then measures combined and PCA showed 5 dimensions – no CFA performed 97: X 110: X 130: X	P F S	C M/ F	110 + 130
6. University Belongingness Scale (adapted from PSSM)	Freeman et al. (2007)	16-Buskirk-Cohen and Plants (2019); 29-Dueñas and Gloria (2017) – a; 30-Dueñas and Gloria (2020) – a	US	M U (29, 30)	1. Social Acceptance 2. Professor's Pedagogical Caring 3. Global University Belonging	18 16 (16) 8 (29, 30)	16: X 29: 0.79 30: 0.79 - 0.80	16: X 29: X 30: X	P F	I/C	29 + 30
7. Overall Sense of Belonging Scale	64-Johnson et al. (2007)	62-Johnson (2011); 63-Johnson (2012); 64-Johnson et al. (2007) 80-Leibowitz et al. (2020)	US	U M (80)	1. Campus sense of belonging (80) 2. Academic major sense of belonging (80) 3. Residential community sense of belonging (80)	5 15 (80)	62: 0.90 63: 0.90 64: 0.90 80: 0.79 - 0.87	80: EFA with PCA, then CFA with factor analysis.	CC	I/C	62, 63, 64
8. Instrument Meeuwisse et al. (2010)	93-Meeuwisse et al. (2010)	93-Meeuwisse et al. (2010) 96-Mohamedhoesein (2017); 150-Van Herpen et al. (2020) – a	NL	U	–	6 7 (150)	93: 0.76 96: 0.78  150: 0.82-0.84	X	P	M/ F	93 + 96

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Table 2 (continued)

A. Name measure	B. Created by (year)	C. Used in (year) – (a = adapted)	D. Location	E. Unidimensional (U)/ Multidimensional (M)	F. Factors	G. # items	H. $\alpha$	I. Psychometric information <sup>a</sup>	J. Entity mentioned in items <sup>b</sup>	K. HE context mentioned in items <sup>c</sup>	L. Eligible for RQ2?	
9. University Belonging Scale	127-Slaten et al. (2018)	127-Slaten et al. (2018); 94-Middleton et al. (2021);	127-US 94-AU	M	1. University affiliation 2. University support and acceptance 3. Faculty and staff relations	24	94: X  127: 0.93-0.94 (total), 0.89 - 0.92 + .85 + 0.88	94: X  127: EFA resulting in 3 factors, CFA with good fit, invariance based on gender with reasonable fit, construct validity and incremental validity sufficient 145: X	P F S	M/ I/C F	–	
10. Sense of Academic Fit	Walton and Cohen (2007)	145-Thompson et al. (2019) 14 – Brady et al. (2016) – a; 82 – Lewis et al. (2017) – a; 103 – O'Brien et al. (2020) – a	145-CA US	M U (14, 82)	1. Sense of social fit in the department 2. Social fit compared with most other students 3. Enjoyment using computers 1. Belonging in evolutionary biology (103) 2. Belonging in ecology (103) 3. Belonging in college (103)	20 10 (14) 3 (82) 15 (103)	14: 0.82 82: 0.79 103: 0.78 + .76 + 0.75	14: X 82: measurement invariance for gender calculated and established 103: X	P F	M/ I/C F	14, 103	
11. Sense of Belonging Scale	Anderson-Butcher and Conroy (2002)	105-Okolie et al. (2021); 152-Wilson et al. (2015) – a (part 1)	105-NG 152-US	U M (152)	1. Sense of Belonging at Class Level (152) 2. Sense of Belonging at Major Level (152)	5 8 (152)	105: 0.97 152: 0.89 + .84	X		C M/ F	–	
12. College Sense of Belonging	11-Bowman et al. (2019); 12-Bowman et al. (2018)	11-Bowman et al. (2019) 12-Bowman et al. (2018)	US	U	–	3	11: 0.73 12: 0.73	–		I/C	11+ 12	
13. University Attachment Scale	France et al. (2010)	78-Lane et al. (2015)	78-US	M	1. Group attachment 2. Member attachment	9	78: X	78: configural, metric, scalar and latent mean invariance tests calculated and established	P	CC	I/C	–
14. Assessment of Collegiate Residential Environments and Outcomes (ACREO; Sense of Belonging factor only)	Inkelas (2007)	153-Winstone et al. (2022) 33-Duran, Dahl, Prieto, et al. (2020) 34-Duran, Dahl, Stipeck, and Mayhew (2020)	153-UK US	U (153) U	–	8 (78) 5	153: 0.82 33: 0.94 34: 0.91	153: X		CC	I/C	33 + 34

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Table 2 (continued)

A. Name measure	B. Created by (year)	C. Used in (year) – (a = adapted)	D. Location	E. Unidimensional (U)/ Multidimensional (M)	F. Factors	G. # items	H. $\alpha$	I. Psychometric information <sup>a</sup>	J. Entity mentioned in items <sup>b</sup>	K. HE context mentioned in items <sup>c</sup>	L. Eligible for RQ2?		
15. The National Study of Living-Learning Programs (Sense of Belonging factor only)	Inkelas (2007)	38-Garvey et al. (2018) 37-Garvey et al. (2020) 100-Niehaus et al. (2019)	38-US 37-US 100-TT	U	–	4	38: 0.85 37: 0.85 100: 0.87	–		CC	I/C	37 + 38 + 100	
16. Programme for International Student Assessment (PISA)	OECD (2013)	22-Cole et al. (2020) 88-Marksteiner et al. (2019) – a	22-US 88-DE	U	–	6 8 (88)	22: 0.86 88: 0.80-0.85	22: CFA and IRT used and deemed sufficient 88: X	P		I/C	22 + 88	
17. College Student Experiences Questionnaire (CSEQ; Sense of Belonging dimension only)	Pace and Kuh (1998)	138-Strayhorn (2008a); 139-Strayhorn (2008b)	US	U	–	3	138: 0.76 139: 0.76	–	P F S			138 + 139	
18. Sense of Belonging instrument Al-Sheeb et al. (2018)	7 – Al-Sheeb et al. (2018)	7 – Al-Sheeb et al. (2018)	QA	U	–	3	X	–			I/C	7	
19. Student Sense of Connectedness Scale (Only the dimensions ‘Relatedness of self with school’ and ‘Belonging/ acceptance with peers’)	Brew et al. (2004)	156-Won et al. (2018) – a	US	M	1. Sense of belonging to school 2. Sense of belonging to peer groups	13 10 (156)	0.87 + .68	Preliminary CFAs conducted and 2-factor model showed better fit than 1-factor model	P	C	I/C	–	
20. Sense of Belonging and Perceived Faculty Support Index	24-Crowe (2021)	24-Crowe (2021)	US	M	1. Sense of Belonging 2. Perceived Faculty Support	10	X	X	P F	C M/ F		–	
21. Peer Belonging	31-Dumford et al. (2019)	31-Dumford et al. (2019)	US	U	–	4	0.72	–	P		I/C	31	
22. Belonging instrument Fink et al. (2020)	35-Fink et al. (2020)	35-Fink et al. (2020)	US	M	1. Students’ social relationships and their overall feeling of fit in the target course 2. Belonging uncertainty	6	X	EFAs and CFAs used with split-half method and 2-factor model with 6 items was determined	P F	C		35	
23. Daily Sense of Belonging	39-Gillen-O’Neel (2021)	39-Gillen-O’Neel (2021)	US	U	–	3	0.82–0.91	–			I/C	39	
24. 1-item belonging instrument Glencross et al. (2019)	42-Glencross et al. (2019)	42-Glencross et al. (2019)	AU	U	–	1	X	–			I/C	–	
25. University Environment Scale	Gloria and Kurpius (1996)	144-Thomas et al. (2014) – part 1	US	U	–	14	0.77 (together with items from #41)	X		F S	C	I/C	144
26. Mathematical Sense of Belonging instrument (MsoB)	Good et al. (2012)	77-Lahdenperä and Nieminen (2020)	FI	M	1. Membership 2. Acceptance	30 29 (77)	0.94 + .87 + 0.90 + .70 + 0.78	EFA performed and 1 item deleted	P F	M/ F		–	

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Table 2 (continued)

A. Name measure	B. Created by (year)	C. Used in (year) – (a = adapted)	D. Location	E. Unidimensional (U)/ Multidimensional (M)	F. Factors	G. # items	H. α	I. Psychometric information <sup>a</sup>	J. Entity mentioned in items <sup>b</sup>	K. HE context mentioned in items <sup>c</sup>	L. Eligible for RQ2?
					3. Affect 4. Trust 5. Desire to fade						
27. STEM Sense of Belonging Measure	Good et al. (2012)	86-Lytle and Shin (2020) – a	US	U	–	4	0.96	–	P	M/ F	–
28. Campus Engagement (with Sense of Belonging as a dimension)	48-Gunuc and Kuzu (2015)	48-Gunuc and Kuzu (2015)	TR	U	–	8	0.90	EFA and CFA performed for construct validity which determined final factor and item structure	S CC	I/C	–
29. 1-item sense of belonging instrument	50-Hall et al. (2020)	50-Hall et al. (2020)	US	U	–	1	X	–		I/C	–
30. Sense of belonging instrument	58-Hussain and Jones (2019)	58-Hussain and Jones(2019)	US	U	–	4	0.88	–		CC	I/C 58
31. Sense of belonging instrument	61-Jackson et al. (2020)	61-Jackson et al. (2020)	US	U	–	5	0.82	–		CC	I/C 61
32. Sense of Belonging and Community Scale	65-Johnson et al. (2020)	65-Johnson et al. (2020)	US	M	1. Commitment to the institution 2. Peer connections 3. Homesickness: separation 4. Homesickness: distressed 5. Academic integration 6. Social integration 7. Satisfaction with institution 8. Living: social aspects 9. Living: environment 10. Living: roommate relationship	32	X	X	P	CC	I/C 65
33. Sense of Belonging survey by	68-Kalender et al. (2019)	68-Kalender et al. (2019)	US	U	–	5	0.84	–		C	–
34. Belonging to the University Scale	Karaman and Cırak (2017)	69-Karaman and Tarim (2018)	TR	M	1. Expectation 2. Motivation 3. Identification	14	0.86 (total), 0.67 + .75 + 0.75	X	S	I/C	–
35. Engagement Evaluation Questionnaire (only the Sense of Belonging dimension)	Korhonen et al. (2017)	76-Korhonen et al. (2019)	FI	U	–	2	0.69–0.76	–		I/C	–

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Table 2 (continued)

A. Name measure	B. Created by (year)	C. Used in (year) – (a = adapted)	D. Location	E. Unidimensional (U)/ Multidimensional (M)	F. Factors	G. # items	H. $\alpha$	I. Psychometric information <sup>a</sup>	J. Entity mentioned in items <sup>b</sup>	K. HE context mentioned in items <sup>c</sup>	L. Eligible for RQ2?		
36. The Campus Connectedness Scale	Lee and Robbins (1995)	46-Graham and McClain (2019)	US	U	–	14	0.87	X	P	CC	I/C	46	
37. University belonging (with Collegiate Psychological Sense of Community Scale, PCS)	Lounsbury and De Neui (1996)	152-Wilson et al. (2015) – part 2	US	U	–	4	0.86	–			I/C	–	
38. Peer environment measures	95-Miller et al. (2019)	95-Miller et al. (2019)	US	M	1. Peer belonging 2. Institutional acceptance	8	0.72 + .68	EFA and CFA conducted to come to 2-factor structure	P F	C	I/C	95	
39. Sense of belonging instrument	Museus et al. (2018)	98-Museus et al. (2018)	US	U	–	3	0.93	–		CC	I/C	98	
40. School Belonging	108-Parr (2020)	108-Parr (2020)	US	U	–	4	0.74–0.77	–		CC	I/C	108	
41. Persistence/Voluntary Dropout Decisions Scale (P/VDD)	Pascarella and Terenzini (1980)	144-Thomas et al. (2014) – part 2	US	U	–	3	0.77 (together with items from #25)	–	P		I/C	144	
42. Perceptions of a sense of belonging instrument	116-Ribera et al. (2017)	116-Ribera et al. (2017)	US + CA	M	1. Peer belonging 2. Institutional acceptance	10	0.78 + .71	EFA and CFAs conducted with good model fit	P F	C	I/C	116	
43. Sense of belonging instrument	Sax et al. (2018)	122-Sax et al. (2018)	US	U	–	3	0.73	–		M/ F		122	
44. STEM Identity Survey (Sense of Belonging items only)	126-Singer et al. (2020)	126-Singer et al. (2020)	US	U	–	17	X	Sample size small, factor analysis did not show exclusive categories between broad measures, authors analyzed on item-level		CC	M/ F	I/C	–
45. Intersectionality of Non-normative Identities and Cultures of Engineering (InIce) survey (sense of belonging in engineering dimension only)	Kirn et al. (2016)	43-Godwin et al. (2018) – a	US	U	–	6	0.91	X			C M/ F		–
46. Sense of belonging instrument	Soria and Stebleton (2013)	132-Soria and Stebleton (2013)	US	U	–	4	0.85	–			I/C	132	
47. Sense of belonging instrument	Soria and Stubblefield (2015)	133-Soria and Stubblefield (2015)	US	U	–	3	0.89	–			I/C	133	
48. Sense of belonging instrument	Soria et al. (2019)	131-Soria et al. (2019)	US	U	–	4	0.86	–			I/C	–	

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Table 2 (continued)

A. Name measure	B. Created by (year)	C. Used in (year) – (a = adapted)	D. Location	E. Unidimensional (U)/ Multidimensional (M)	F. Factors	G. # items	H. $\alpha$	I. Psychometric information <sup>a</sup>	J. Entity mentioned in items <sup>b</sup>	K. HE context mentioned in items <sup>c</sup>	L. Eligible for RQ2?
49. Social Connectedness (measured as sense of belonging)	Summers et al. (2005)	155-Won et al. (2021) – a	US	U	–	12 9 (155)	0.93	CFA conducted and acceptable fit determined	P	I/C	–
50. Web-based survey University of California Undergraduate Experience Survey (UCUES; Sense of Belonging dimension only)	University of California (2008)	117-Riggers-Piehl and Lehman (2016)	US	U	–	5	0.82–0.85	–		I/C	–
51. 1-item instrument Whitten et al. (2020)	151-Whitten et al. (2020)	151-Whitten et al. (2020)	US	U	–	1	X	–		I/C	151
52. The Student Belongingness, Engagement and Self-Confidence Scale (Sense of Belonging subscale only)	Yorke (2016)	135-Spencer et al. (2020)	CA	U	–	6	0.74	PCA conducted and factor structure confirmed	F	C	–

<sup>a</sup> In this column, only for instruments of 6 or more items information is displayed.

<sup>b</sup> P = Peers, F = Faculty, S = non-teaching Staff, CC = Campus Community.

<sup>c</sup> C = Classroom level, M/F = Major (non-US: educational program) level/Field, I/C = Institutional/Campus level.



In around one third of quantitative or mixed method studies where multidimensional measures were used, a more extensive psychometric analysis was reported beyond Cronbach's alpha (Table 2), such as a confirmatory or an exploratory factor analysis. This is striking considering the large variety in definitions and measures of sense of belonging in HE, and more specifically, the fact that most measures are unidimensional. One would expect that authors who do use a multidimensional measure would substantiate and investigate this choice with extensive psychometric investigation. Within the studies that used a quantitative measure for sense of belonging in HE, eight studies adapted an existing multidimensional measure to a unidimensional measure or an existing unidimensional measure to a multidimensional measure. From these studies, only Lewis et al. (2017) and Knekta et al. (2020) mentioned that the initial choice to adapt the measure was made based on factorial investigation (Table 2).

In the items used in the sense of belonging in HE instruments, as shown in Table 2 (column 10), peers as entity are mentioned most often (e.g., "It is difficult to make friends at this institution"; Dumford et al., 2019), followed by faculty and the campus community (e.g., "I feel comfortable seeking help from a teacher before or after class", "I see myself as a part of the campus community"; Hoffman et al., 2002; Hurtado & Carter, 1997). Only a small number of measures included items focused on non-teaching staff (e.g., "The library staff is willing to help me find materials/books"; Gloria & Kurpius, 1996). In terms of context (see column 11 of Table 2), the HE institution or campus was explicitly mentioned in the items of most of the measures (e.g., "I want to be a part of things that students are doing at this University"; Brew et al., 2004). The major/field or the classroom context was only mentioned in the items of a limited number of measures (e.g., "Most faculty in my major know me by name", "I generally feel comfortable expressing my ideas in class"; Crowe, 2021).

### 5.3. Ethnicity and generation status in HE and definitions of sense of belonging

From the 150 included studies, 84 studies reported information regarding students' ethnicity and/or generation status in HE, and 66 studies did not (see RQ2 in Fig. 1). Concepts mentioned most often in the studies that addressed students' ethnicity and/or generation status in HE were "connectedness", "valuation", "importance", "mattering", "being or feeling a part of", "social relations", "sense of identification", and "membership". The most cited authors from the definitions were Strayhorn (cited 15 times; 2012, 2019), and Hurtado and Carter (cited 12 times; 1997). Remarkably, while Goodenow (1993) was often cited in studies that did not address students' ethnicity or generation status in HE (i.e., in 36% of the studies), almost no reference was made to Goodenow (1993) in studies that did address students' ethnicity and/or generation status in HE (i.e., in 6 % of the studies).

It is notable that many of the additional concepts that emerged from qualitative studies were found in studies that included students' ethnicity and/or generation status in HE. More specifically, the concepts "experience diversity", "feeling similar or experience similarities", "wanting to contribute", "feeling safe", and "self-investment" were mainly found in these studies (Daniels et al., 2021; Duran, 2018; Vaccaro & Newman, 2016). In qualitative studies that did not address students' ethnicity and/or generation status, these concepts were absent or only incidentally found.

### 5.4. Ethnicity and generation status in HE and measures of sense of belonging

We found that different instruments were being used in studies that addressed students' ethnicity or generation status in HE compared to studies that did not address these background indicators. Seven instruments were used in both groups of studies, including the PCS (Bollen & Hoyle, 1990), the PCS-adapted (Hurtado & Carter, 1997), the PSSM-adapted (Pitman & Richmond, 2008), and The Sense of Belonging Instrument by Hoffman et al. (2002). Two noteworthy findings are related to the most- and least-used sense of belonging in HE measures in both type of studies. Firstly, one of the most popular and well-known measures to examine students' sense of belonging in HE, namely the PSSM (Goodenow, 1993), was used in none of the quantitative or mixed method studies that took students' ethnicity and/or generation status in HE into account. In comparison, almost a quarter of the quantitative or mixed method studies that did not address students' ethnicity or generation status in HE used this measure. This finding aligns with the earlier finding that Goodenow (1993) was rarely cited in definitions of studies that addressed students' ethnicity and/or generation status in HE. Secondly, the measures that were used most often, namely in 13 of the quantitative and mixed method studies that addressed students' ethnicity and/or generation status in HE, were the PCS and the PCS-adapted (Bollen & Hoyle, 1990; Hurtado & Carter, 1997). Notably, in studies that did not address students' ethnicity or generation status, the PCS and PCS-adapted were rarely used (Bollen & Hoyle, 1990; Hurtado & Carter, 1997).

In addition to the findings regarding the types of measures that were used in studies that did and did not address students' ethnicity or generation status in HE, important insights can be found when we look at the content of the measures or the items.

In all the multidimensional measures used in studies addressing students' ethnicity or generation status in HE, "peer belonging/support/connections" or "social relationships/fit" was included. In studies that did not address students' ethnicity or generation status, this was only the case in one third of the multidimensional measures. Furthermore, there were two clear differences in the items from the measures used by studies that did and studies that did not address students' ethnicity or generation status in HE. First, in studies addressing students' ethnicity and/or generation status in HE, the campus community as entity and the HE institution or campus as part of the HE context were mentioned considerably more often in the items of the used measures. Second, the remaining HE contexts (i.e., major/field and classroom) were mentioned less often in the items of the measures that were used by these studies compared to studies that did not address students' ethnicity or generation status. For peers, faculty, and non-teaching staff, we did not find large differences within the items of the measures that were used by the two groups of studies (see columns 10 and 11 in Table 2).

### 5.5. In retrospect: the quality of the included studies

While the quality of the included studies, as appraised by the six criteria (see Method section), was considered sufficient in most of the studies, we did develop two concerns that are important to consider when the results of this review are interpreted.

Firstly, the quality appraisal revealed that the alignment between the definition and quantitative measure of sense of belonging in HE (i.e., criterium c in quality appraisal) was deemed insufficient for 31 of the 95 quantitative studies included in this review. This means that for 31 quantitative studies, the way in which sense of belonging in HE was measured did not sufficiently match the way in which it was defined in the introduction according to our understanding.

Secondly, in only slightly more than half of the studies that addressed students' ethnicity or generation status in HE, the sample sufficiently resembled the population in terms of the background indicators ethnicity and generation status in HE (i.e., criterium 6 in the quality appraisal). In multiple studies, no information about either the ethnicity or the generation status in HE of the sample or the population was given, even though these indicators were used in the results when discussing students' sense of belonging in HE.

### 5.6. Critical analysis of the definitions and measures of sense of belonging

Our critical analysis (Torraco, 2005) revealed several important challenges in both the quality and the content of the included definitions and measures of students' sense of belonging in HE. The first challenge, which confirms the concern we expressed in the introduction, is that the number of different definitions and measures of sense of belonging in HE in the studies included in this review is extensive and varies greatly. Consequently, it is not possible to directly compare the results of studies that used different definitions and measures of sense of belonging in HE. For example, Solanki et al. (2019) and Hausmann et al. (2009) both studied the effects of an intervention on the sense of belonging in HE of underrepresented students, but defined and measured sense of belonging in HE very differently. Solanki et al. (2019) used an eight-item measure of sense of belonging in HE (with items such as "If I miss a Bio Sci class, I know students who I could get the notes from"; Hoffman et al., 2002) and found that underrepresented students' sense of belonging in HE was significantly higher after participation in the studied intervention. Hausmann et al. (2009) used a three-item measure of sense of belonging in HE (with items such as "I feel a sense of belonging to the campus community"; Bollen & Hoyle, 1990) and found that the sense of belonging of African American students did not increase after participation in the studied intervention. If these results are compared, one could conclude that only the intervention studied by Solanki et al. (2019) should be used to improve underrepresented students' sense of belonging in HE. However, the sense of belonging in HE definitions and measures differed greatly between Solanki et al. (2019) and Hausmann et al. (2009) and therefore do not warrant such a conclusion. In this case, it remains unclear what intervention is best to use for strengthening underrepresented students' sense of belonging in HE and how sense of belonging in the HE environment can be improved.

A second challenge that arose from the current review is the misalignment between the definition and measurement of sense of belonging in HE. Definitions of sense of belonging in HE included several underlying concepts such as acceptance, respect, support, and connectedness (see Table 1 for all concepts). However, sense of belonging in HE was often measured with only three items that did not include these underlying concepts specifically. Thus, in addition to the misalignment *between* studies, as shown in the example of Solanki et al. (2019) and Hausmann et al. (2009), our review showed misalignment of the definition and measurement of sense of belonging in HE *within* individual studies. It is worrisome that we found a misalignment between the definition and measurement of sense of belonging in HE in a substantial number of the included studies for this review. Evidently, there is a need to be clear about how the definition of sense of belonging in HE translates to a measure (i.e., operationalization of sense of belonging in HE) and what the context and entities are with which it is associated.

The third challenge in this review refers to the definition of sense of belonging in HE specifically. To have a complete and accurate understanding of students' definition of sense of belonging in HE, it is vital to use input from studies that included student populations with varying background indicators such as ethnicity and generation status in HE, directly. For example through interviewing both ethnic minority and majority students about their understanding of sense of belonging in HE or by reviewing qualitative studies in which this is discussed in the results. However, in existing definitions of sense of belonging in HE, input such as what a student "brings" or wants to contribute to HE, or "gets" from HE in terms of self-investment for example, is not included (Table 1). Remarkably, current definitions and measures of sense of belonging in HE used in quantitative studies also do not include concepts, such as "wanting to contribute" or "experiencing similarities", that were found to be specifically relevant in studies that addressed students' ethnicity or generation status in HE. Therefore, authors should be critical towards the definition of sense of belonging in HE that they use and its translation to a measure, making sure that it is sensitive to the experiences of all students in their sample.

We made a more hopeful observation when analyzing the sense of belonging in HE definitions of quantitative studies. There is consensus between the most cited authors (Goodenow, 1993; Strayhorn, 2019) about the core elements of sense of belonging in HE, namely: acceptance, connectedness, support, valuation, and respect. This means that within the excess of definitions of sense of belonging in HE, a common thread can be found. This common thread can serve as a baseline for the sense of belonging in HE definition and can be further developed using insights from qualitative studies and studies that address students' ethnicity and generation status in HE.

A fourth and final challenge in this review is the lack of psychometric investigation of the sense of belonging in HE measures. In the studies in this review, only 19 of the 47 studies with 6 items or more performed some sort of psychometric investigation beyond Cronbach's alpha with the measure they used to further establish reliability and/or validity (see Table 2). Moreover, within the studies that addressed students' ethnicity and/or generation status in HE, it was not investigated whether the measures that were used were invariant across the different student identity groups such as first- and continuing-generation students in HE. This is problematic as

studies (Gopalan & Brady, 2020; Hausmann et al., 2009; Stebleton et al., 2014) do report that underrepresented students, such as ethnic minority students and first-generation students, experience less sense of belonging in HE compared to their peers. However, with the lack of extensive psychometric investigation, it remains unclear if the assessment of students' sense of belonging based on background indicators such as ethnicity is valid. This concern is further supported by the discrepancy between studies that did and did not address students' ethnicity or generation status in HE in terms of the definitions and the content of the measures of sense of belonging in HE. This discrepancy therefore highlights the importance of doing extensive psychometric investigation. Even more importantly, it shows that it is essential to determine what sense of belonging in HE means for different student identity groups before a measure is chosen.

## 6. Discussion

In this systematic literature review with an integrative approach (Torraco, 2005), we explored how the sense of belonging of students in HE is defined and measured (RQ1) and how this differs in studies that address students' ethnicity and generation status in HE compared to studies not addressing these student background indicators (RQ2). For RQ1, we found numerous definitions of sense of belonging in HE in quantitative studies that varied in what concepts were used to define sense of belonging in HE (with the concepts acceptance, connectedness, and support mentioned most often), in what social entities were mentioned (e.g., peers, faculty, non-teaching staff, and the campus community), and in what contexts the definitions were placed (e.g., classroom, major/field, and HE institution/campus). Additional concepts (e.g., being yourself or feeling similar) were identified from students' definitions of sense of belonging in HE as reported in qualitative studies. To measure sense of belonging in HE, 52 separate instruments were used in the quantitative studies, of which almost three quarters were reported on in one article only. For RQ2, comparing studies that did and did not address students' ethnicity or generation status in HE, we found large differences in which authors' definitions were cited most often and which well-known measures were used. Moreover, most of the additional concepts from qualitative studies were found in studies that addressed students' ethnicity and/or generation status in HE in relation to their definition of sense of belonging in HE (e.g., experience diversity, feeling similar, and wanting to contribute).

Our review contributes to the existing literature in several ways. As our review focuses on the sense of belonging of students in HE, we give a comprehensive and complete overview of the most used definitions and measures of sense of belonging in HE and what the ambiguity that exists about this concepts entails. Furthermore, by devoting a research question to a specific focus regarding the HE student population, we now know that differences between the definitions and measures of sense of belonging in studies that did and did not focus on students' ethnicity or generation status in HE exist. This stresses the importance of carefully designing and interpreting research on a similar topic, due to varying contextual elements such as students' background indicators. Also, it has become clear that validity issues of sense of belonging measures and outcomes are present. We will elaborate on how to deal with this in existing and future research further on.

From these results, several challenges emerged regarding ambiguity about the understanding and measures of sense of belonging in HE, misalignment between the sense of belonging in HE definitions and measures, a shortage of experiences from student populations where ethnicity or generation status in HE were addressed in relation to sense of belonging, and the missing validity and measurement invariance investigation of sense of belonging in HE, specifically for the student background indicators ethnicity and generation status in HE.

### 6.1. Data synthesis of the sense of belonging definitions and measures

Following the integrative approach as described by Toracco (2005), we conducted a data synthesis, and more specifically we discuss the first foundational steps that can lead to a conceptual classification for the definition and measurement of students' sense of belonging in the HE context. We start with a further exploration of possible explanations of two important results: the differences in choices for specific authors and/or instruments to study students' sense of belonging in HE between studies that did and did not address students' ethnicity or generation status in HE, and the misalignment between definitions and measures that was found in one third of the studies. This section ends with the generation of our perspective on the definition and measurement of sense of belonging in HE research.

Remarkably, we uncovered the fact that Goodenow's sense of belonging in HE definition and (adapted) PSSM (1993) were rarely chosen in studies that addressed students' ethnicity or generation status in HE. In comparison, Bollen and Hoyle's (adapted) PCS (1990) was chosen relatively often in studies that addressed students' ethnicity or generation status in HE. As the original and adapted PCS-instruments only consist of three very general items, the content of this instrument does not seem to be the reason for its selection in studies that addressed students' ethnicity or generation status in HE. A more evident explanation lies in Hurtado and Carter's (1997) critical discussion of a theory that is often used as the basis for sense of belonging, combined with the fact that they chose to use the (adapted) PCS-instrument. Hurtado and Carter (1997) explicitly critiqued the often-used terms "social and academic integration" that derived from Tinto's student integration theory (Tinto, 1993) and are mentioned often in relation to sense of belonging or even as a synonym. They mentioned that these terms can encompass something distinctly different for historically underrepresented groups in HE. For these students, integration is often interpreted as such: to be successful (or successfully integrate) in HE, historically underrepresented students should adopt the norms and values of the dominant student groups and abandon their own (Hurtado & Carter, 1997). Hurtado and Carter also studied the sense of belonging of racial and ethnic minority groups in HE with the PCS (Hurtado & Carter, 1997).

The PSSM was hardly chosen in studies that addressed students' ethnicity or generation status in HE compared to the use of the

PCS. This difference in use is odd in the sense that the content of the PSSM seems fitting in relation to specific background indicators such as ethnicity as the items contain short remarks in relation to underlying concepts such as respect, inclusion, and safety. However, Goodenow does explicitly use the term ‘integration’ in relation to her explanation of the development of students in school during their adolescence. Furthermore, what might be the main reason for the more frequent use of the PCS compared the PSSM, is the explicit focus on underrepresented students. Goodenow does discuss sense of belonging outcomes in relation to students’ ethnic minority status, but this was done to determine construct validity rather than a specific interest in this background indicator. This explanation is strengthened by the fact that in the development of the PSSM-adapted, an instrument that was used more often in studies focused on ethnicity and generation status in HE, Pittman and Richmond (2007) specifically studied underrepresented (i.e. first-generation) students’ sense of belonging and they did not mention integration.

In short, we suspect that because Hurtado and Carter (1997) critiqued Tinto’s integration theory (1993) specifically from historically underrepresented students’ perspectives, and because they used the PCS-adapted to study sense of belonging with ethnic minority students specifically, the PCS (adapted) was used relatively often in studies that addressed students’ ethnicity or generation status in HE.

Subsequently, we further explore a result from RQ1, namely the misalignment between definitions and measures that was found in one third of the included quantitative and mixed method studies. One possible explanation for the misalignment is that sense of belonging is a universal need (Baumeister & Leary, 1995), and therefore scholars will often have an intuitive understanding of what this construct means in HE. Additionally, as students’ sense of belonging in HE is situational, one can feel respected in one social or educational setting and isolated in another. Moreover, experiences and interactions with peers and educational personnel within the HE institution can happen in a variety of places and situations (Ribera et al., 2017). While scholars can have an intuitive understanding of the meaning of sense of belonging in HE (and its definition), they might not recognize or find that sense of belonging in HE needs to be measured on different dimensions and in different contexts. Another explanation could be that it can be unfeasible to include an extensive multidimensional measure covering all the existing dimensions of sense of belonging in HE when other variables are also included. This is despite the fact that authors recognize the multidimensional nature of sense of belonging reflected by the often-cited multidimensional definition of sense of belonging in HE by Strayhorn (2012; 2019),

Following further insights into the challenges in sense of belonging in HE research, we conclude the synthesis with the generation of our perspective on the definition and measurement of students’ sense of belonging in HE. On the one hand, sense of belonging in HE is dependent on a student’s internal needs and goals in how they experience the different underlying concepts of sense of belonging in HE (such as respect, acceptance, and valuation), representing the “sense” or feeling in sense of belonging. In our review, we have found several indications that different student identity groups can have different needs and goals in the HE environment with regards to their sense of belonging in HE. The first indication is that additional definitions of sense of belonging in HE mentioned by students in qualitative studies were mainly found in studies that addressed students’ ethnicity or generation status in HE. The second indication is the difference in the choices that were made regarding the cited author and instrument for the definition and measure of sense of belonging in HE between studies that did and did not address students’ ethnicity or generation status in HE. In future research, the relevance of the different concepts should be examined in relation to the intersections of several students’ background indicators and experiences such as ethnicity and generation status in HE.

On the other hand, sense of belonging in HE is dependent on the external environment constituting HE, which consists of different entities, such as peers and staff, and varies from a module in a classroom to a major or an educational program, a specific field, or the university campus. The concretization of these entities and contexts should not be overlooked in the definition nor in the measure of sense of belonging, as this is crucial to translate results on students’ sense of belonging into an intervention or improvement that actually increases sense of belonging in HE and ultimately, equity. This need for contextual distinction is illustrated in qualitative studies such as work by Duran (2018) when he discusses how different interviewed queer students of color relate their experienced belonging to different educational contexts. Several participants experience belonging; however, one discusses his belonging on the department level while others discuss their belonging in relation to the campus community. Another example from Daniels et al. (2021) shows a distinction in underrepresented students’ description of belonging between individual (if the student mattered) and institutional (if diversity mattered) levels. When measures do not specify the HE context, such differences are not uncovered which could lead to misinterpretation of the data. Therefore, in addition to the underlying concepts of sense of belonging in HE (e.g., feeling accepted or valued by someone), the situational aspect or context (such as a specific building or a person) a student can feel connected to should not be overlooked.

We conclude the data synthesis with recommendations to translate our insights into more concrete examples of definitions and measures of sense of belonging in HE. Authors that deliberately mention the need to unpack sense of belonging in relation to specific student groups are Ribera et al. (2017). They give and then nuance their definition of sense of belonging. Although they use the controversial term “integration”, they clarify how it should be understood (i.e., not as a behavioral construct but rather a psychological one). After discussing integration in relation to belonging, they add Strayhorn’s (2012) perspective that students’ sense of belonging is not only about relations with other students but rather with multiple actors within the campus community such as faculty and administrators. Furthermore, Ribera et al. (2017) mention that sense of belonging is situational and that finding social environments that align with students’ personal values might be specifically important to marginalized students. This example shows how the authors thoroughly thought about the meaning of the definition of sense of belonging that they used, and what critical discussion was needed to relate this concept to the specific student body and HE context that they study.

Lastly, we discuss an example of a more contextualized measure of sense of belonging, namely that of Wilson et al. (2015). These authors chose to place four items of belonging in three different HE contexts (i.e., class, university, major) and found differences between these three contexts in effects of belonging on engagement. While the measure used in Wilson et al. (2015) already

contextualizes sense of belonging items more than most used measures, there is no mention of the specific actors a student can feel belonging towards. We would recommend authors to be explicit about the situational and social HE context in future sense of belonging measures.

## 6.2. Strengths and limitations

Our study has several strengths. First, as we included a high number of quantitative, mixed method, and qualitative studies from the last twenty years, resulting from a search according to the PRISMA guidelines for review (Liberati et al., 2009), the results of our review are representative of the existing body of research about sense of belonging in HE. Second, as we deliberately chose to only include studies that specifically define sense of belonging in HE, we were sure that the included studies were focused on the HE context specifically and could therefore be compared. Finally, it became apparent that the distinction we made between research that did and did not specifically address certain groups of students (in our case, ethnicity and generation status in HE) was essential for sense of belonging in HE research, as different results emerged from both types of studies.

In addition to the strengths of our review, we discuss limitations that should be considered. First, as most of the included studies used data from the USA ( $n = 88$ ) and Europe ( $n = 17$ ) and the current sense of belonging in HE definitions and measures have mainly been developed by authors from the USA (Goodenow, 1993; Hurtado & Carter, 1997; Slaten et al., 2018; Strayhorn, 2019), this review relies heavily on data from these regions. Therefore, perspectives and insights from authors and students in other parts of the world (such as most African and Asian countries) have not been included. This should be considered for the interpretation of our findings and its universal usability. Second, studies (Gopalan & Brady, 2020; Hausmann et al., 2009; Stebleton et al., 2014) showed that students' ethnicity and generation status in HE were important indicators to study in relation to sense of belonging in HE. However, as the HE student population has become more heterogeneous, there are other historically underrepresented students, such as LGBTQI+ students, neurodivergent students, or students with a physical impairment, that we did not focus on but deserve urgent attention in future research on sense of belonging in HE.

## 6.3. Implications for research and educational practice

The first theoretical implication of our study, following the post positivist approach, is that definitions of sense of belonging in HE from qualitative studies were used as additional to input from the quantitative studies. However, the results imply that more attention needs to be paid to existing qualitative work on the definitions of sense of belonging in HE. One of the main insights from qualitative studies was the addition of underlying concepts of sense of belonging such as "experience diversity" or "similarities" to the existing definitions used in quantitative studies. These underlying concepts mostly came from studies focused on students' ethnicity or generation status in HE. Future research could further unpack the sense of belonging phenomenon by either synthesizing and analyzing qualitative studies focused on the definitions of sense of belonging of specific student groups in HE, or by conducting qualitative studies on sense of belonging in relation to students' (intersecting) background indicators.

Secondly, although this review sheds light on the choices that need to be made when studying, defining, and measuring students' sense of belonging in HE, this concept cannot be studied in isolation as it will always be part of an interwoven system of influential factors within the HE context. Chen and Zhou (2019) reviewed which factors were specifically relevant for Chinese international students' sense of belonging. Broadening this approach in future research by including factors that are relevant to the whole HE student body could help to further unpack students' experiences in HE, and ultimately shed light on what could be improved for whom to increase the academic attainment gap.

Alongside implications for future research, findings of this review point to several crucial considerations for the HE practice. Primarily, it must be clear what underlying concepts of the broad sense of belonging definition are relevant for a HE institution when the goal is to make positive changes for its student population's sense of belonging. Students' identities are a complex mix of several intersecting indicators, where generalizations should not be made. Ideally, a representative body of students is included in different steps of the creation and implementation of sense of belonging-related policy and practice. Moreover, sense of belonging in relation to a HE campus or one specific educational program are two different things. In practice, it is therefore imperative to be aware of this difference and to deliberately choose what HE context(s) need attention in what way, such as feeling respected by classmates specifically or all students on campus. The variety of definitions as shown in our review strongly suggest that sense of belonging in HE interventions cannot be a one-size-fits-all-contexts solution.

## 7. Conclusion

In summary, there was a large variety and ambiguity in the definitions used and the 52 separate instruments of sense of belonging in HE, and the extent to which instruments were psychometrically tested. Additionally, there were substantial differences in the definitions and measures of sense of belonging in HE between studies addressing or not addressing students' ethnicity or generation status in HE. Most of the additional concepts from qualitative studies that were missing in quantitative definitions were found in studies that addressed students' ethnicity or generation status in HE. Insights from our integrative data analysis showed that it is imperative for future work to (a) consider the multidimensional underlying concepts, entities, and contexts of sense of belonging in HE when selecting a definition and measure, (b) make sure that the chosen definition and measure align, and finally (c) consider what sense of belonging in HE definition and measure is fitting for the different (intersecting) student identity groups that are studied.

## Author statement

**Sabine E. Severiens:** Methodology, Validation, Writing – Review & Editing, Supervision.

**Marieke Meeuwisse:** Methodology, Validation, Formal Analysis, Writing – Review & Editing, Supervision.

**Aike S. Dias-Broens:** Methodology, Formal Analysis, Data Curation, Writing – Original Draft.

## Declaration of competing interest

We have no known conflict of interest to disclose.

## Data availability

No data was used for the research described in the article.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.edurev.2024.100622>.

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