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# Social-Belonging Interventions in Academic Settings
## A review

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# 1 Foreword

Social psychological interventions have been playing an important role in research aiming at producing useful new insights into the psychological processes of optimal learning and development for children, adolescents, and young adults. In this area of research, the view that the environment is essential for our development of skills and abilities as well as our well-being and health is predominant. This means that the environment can be altered to promote motivation, engagement and thriving among the people that operate or live there. The idea is that, on a personal level, we take in information from our surrounding situation or setting and we start considering: Do we belong in the situation or not? Are people around us evaluating or judging us? Will we be respected or not? Can we trust that our efforts will be valued? For instance, if you push yourself and try something hard or new, you risk putting yourself out there, where you might look dumb and lack ability, and the question whether you can feel safe enough to invest you efforts arises. You may ask yourself if it is OK to learn and show others what you have not yet mastered. Consequently, since you cannot learn something you already know, it is crucial that you feel safe enough to get out of your "comfort zone" (i.e. pushing yourself to improve) and focus your learning on things you cannot yet do. Getting out of your comfort zone is one of the major predictors for efficient practice and achievement.

Research on achievement has shown that there is a certain type of practice that develops skill but also that this type of practice must be worth it from the person's perspective since it requires trust, trust that the unpleasant feeling and frustration involved in learning is worth it, given what you know about the setting. Interventions aimed at securing a feeling of trust and belonging in different environments study, for instance, the reasons that some students benefit more from schooling than others, even when they have the same cognitive abilities. Here, lessons are learned by introducing changes into a system and how these changes affect outcomes and the system over time. The present report aims to examine current research literature for one of the main groups of theories that constitute a base for interventions often used to instill motivation for learning: social-belonging interventions. Thus, the focus of the present report is to describe research based on Walton, Cohen and colleagues' models of social belonging and belonging uncertainty through the examination of a selection of published studies and meta-analyses. Thus, the purpose of this review was to present an overview of current research on experimental interventions on social belonging among students of all ages. Experimental research enables conclusions to be drawn of how to affect belongingness, in contrast to other methods limited to revealing associations and indications of possible causal relations. This is done in order to prepare for the possibility of translating and testing similar approaches in a Swedish context. Here, the aim is to start building a firm evidence base for the implementation of research into practice in Swedish settings. Moreover, this paper is not a meta-analysis or systematic review, but instead aims to present published studies that can be used as inspiration for future motivation studies in a Swedish context. This is a review designed to survey one type of social-psychological intervention (i.e. social belonging) in education, not a comprehensive review of all existing interventions within the field.

The main research question that guided the literature search was: What are the outcomes of experimentally tested social-belonging interventions in educational settings? Examining the literature, we noticed that there were few studies on interventions explicitly targeting social belonging, but several studies tested if other kinds of psychological interventions did affect social belonging. Thus, another question arose: What kind of experimentally tested interventions in educational settings, which have not explicitly targeted social belonging, have been seen to affect students' sense of social belonging? The planning of this paper as well as the literature search was designed by Ann Rudman (AR), Petter Gustavsson (PG), and Nadja Högman (NH), and later performed by NH in collaboration with KIB (www.kib.ki.se). NH wrote the first draft of this paper and selected articles and their results. Petter Gustavsson (PG) conducted separate searches for relevant meta-analyses and wrote the first draft of the sections reporting and discussing these papers. NH wrote the first drafts of the results. NH and PG wrote the first drafts of different paragraphs in the discussion. NH and AR, in collaboration with all co-authors, finalized the report. The authors are responsible for the content in this report.

The results presented in this paper have been discussed at a seminar at Ekskäret Klustret (www.klustretstockholm.se) arranged by the Reinventing Learning Foundation (http://www.reinventinglearning.org/), who invited social entrepreneurs with special interest in the psychological wellbeing of youths in the educational setting in Sweden. The authors would like to give a special thanks to Kim Törnqvist at Reinventing Learning Foundation for coordinating this work and the seminar. Thanks also to Erik Fernholm, Malin Rapp, and Erika Lundblad from the Reinventing Learning Foundation and GrowingMinds (www.growingminds.se) for their input. Thanks also to all people at Reinventing Learning and Ekskäret Foundations (and friends of these initiatives) who attended the seminar and contributed to the discussion.

This review would not have been possible without a grant from EKSKÄRET to Nadja Högman and a grant from Axfoundation, Antonia Ax:son Johnson Foundation for Sustainable Development (www.axfoundation.se). We gratefully acknowledge their contribution to this work. Ann Rudman's participation in this study was made possible thanks to a grant from AFA Insurance. In addition, Karolinska Institutet funded the contributions made by Petter Gustavsson.

# 2 Summary and conclusions

The need to belong has been described as a basic human need for motivation. In educational settings, *sense of belonging* is associated with greater psychological well-being, more engagement, and higher academic achievement outcomes. On the contrary, doubting whether you are valued and respected by others has been described as a stress that hinders engagement in building social connections as well as in learning, which in the long run affects persistence and performance negatively. Students in negatively stereotyped or underrepresented groups in educational settings tend to more often experience concerns of belonging uncertainty and these concerns may contribute to achievement gaps between students of different social groups (e.g., social class, ethnic background, and gender).

The present literature review aims to identify and summarize empirical research on social-belonging interventions in educational settings. The main focus was to look into the effects of experimentally tested social-belonging interventions to see if enhancing students' sense of belonging could affect academic engagement and achievement. A literature search was performed, and seven studies on experimentally tested social-belonging interventions in educational settings were identified.

The results of these studies revealed that, in addition to bolstering students' sense of belonging, academic and social integration, and sense of social fit, the interventions increased academic engagement, persistence, and performance. They even enhanced psychological well-being and physical health, and the effects were seen for up to three years after the interventions. As predicted, effects diverged between different groups of students. Of the seven studies, six revealed the same pattern of having positive effects on negatively stereotyped and underrepresented students only (e.g., Black American students, socially and economically disadvantaged students, and female students in male-dominated academic fields). In addition to the studies on social-belonging interventions, we found studies on other kinds of interventions that were found to have effects on student belongingness as well, namely *values affirmation*, *role models*, *difference education*, *growth mindset*, *critical feedback*, and *cultural fit*.

The findings constitute examples of how sense of belonging can be bolstered by targeting different psychological mechanisms that influence how students perceive their educational context and thereby improve academic outcomes. In summary, we found evidence that well-designed psychological interventions can affect students' sense of belonging, academic engagement, and achievement. The present review provides the most support for a social-belonging intervention developed by Gregory Walton and colleagues as being an effective tool for student motivation and achievement. This intervention was tested in six separate studies on different student populations and showed consistent positive effects on students of negatively stereotyped or underrepresented groups. However, all studies were performed on

American students transitioning to college and thus, no conclusions can be drawn of its effectiveness in other contexts.

The present review did not aim to provide a complete overview of all possible studies that may have effects on student belongingness. Instead, the intervention studies found, aside from the social-belonging, that intervention studies should be seen as examples of other possible interventions which may be further explored. Possible implications and future studies are discussed.

# 3 Background

The need for *social belonging* has been described as a basic human motivation (Baumeister & Leary, 1995; Ryan & Deci, 2000). To feel connected to and valued by other people affects overall health, well-being, and achievement. A range of positive psychological variables has been linked to perceived belongingness, for example, self-efficacy, life satisfaction, and happiness (Allen & Bowles, 2012), and feeling like you belong has been seen to protect against psychopathology and stress (Baumeister & Leary, 1995). Moreover, sense of belonging predicts physical health and mortality, with social isolation being a risk factor equal to or greater than those associated with smoking, obesity, and high blood pressure (Holt-Lunstad, Smith, & Layton, 2010).

In recent years, increased attention has been drawn to social belonging in educational settings and its impact on students' motivation, achievement, and well-being (Allen & Bowles, 2012; Osterman, 2000; Rattan, Savani, Chugh, & Dweck, 2015; Spitzer & Aronson, 2015; Tillery, Varjas, Roach, Kuperminc, & Meyers, 2013L; Walton & Carr, 2012). For example, studies show that sense of belonging predicts math achievement in middle school students (Barbieri & Booth, 2016) and reading ability in the PISA[1] assessments (mediated by increased effort and perseverance in learning) (Lee, 2014). Further, it has been associated with perceived self-worth, scholastic competence, academic self-efficacy, and intrinsic motivation (Freeman, Anderman, & Jensen, 2007; Gummadam, Pittman, & Ioffe, 2016) as well as behavioral and emotional engagement (Wilson et al., 2015). Experimental studies show that, even when derived from a minimal social connection, belonging predicts task motivation and persistence (Walton, Cohen, Cwir, & Spencer, 2012). Moreover, it has been argued that interventions to improve students' sense of school belonging are important also because of strong links between a low sense of belonging and emotional as well as behavioral problems in youths (Cook, Purdie-Vaughns, Garcia, & Cohen, 2012; Gaete, Rojas-Barahona, Olivares, & Araya, 2016; Georgiades, Boyle, & Fife, 2013). A high sense of belonging at school has, for example, been associated with fewer depressive symptoms (Gummadam et al., 2016). On the basis of previous research, a few attempts have been made to provide guidelines for schools and teachers on how to foster belongingness, but a need for more systematic and experimental research has been called for (Allen & Bowles, 2012; Field & Hoffman, 2012).

The focus of the current review is to review research on social-psychological interventions in educational settings (Garcia & Cohen, 2011) that enhance students' sense of belonging. The social psychological framework tries to understand psychological factors within the individual and how they interact with factors in the social context. The main focus is not to understand structural factors in the educational environment that may suppress students' sense of belonging at school, but rather the emphasis is how students perceive, interpret, think, feel, and behave in certain settings,

[1] Program for International Student Assessment 2000

and how certain psychological factors (e.g., beliefs, attributions, uncertainties, mindsets) may function as barriers to reaching one's full potential, persevering in the face of challenges, and to psychological well-being (Cohen & Garcia, 2014; Spitzer & Aronson, 2015).

## *3.1 Inequality in education*

In the United States, it has long been known that there are academic achievement gaps between students of different ethnical and socioeconomic background, both in grades and in graduation rates. On average, Black and Latino American students perform lower on diagnostic tests than White and Asian American students (Inzlicht & Schmader, 2012) and they more seldom start or graduate from higher education (NCES, 2013). Similar gaps are found by socioeconomic status (NCES, 2015). Further, there are also substantial gender differences in the number of men and women entering and pursuing in pSTEM fields (physical science, technology, engineering, and math) (in 2013, 18.4 % of undergraduate students in these fields were women) (National Science Foundation, National Center for Science and Engineering Statistics, 2013). Women also perform worse than men in quantitative fields, especially in settings with salient gender biases (Bonnot & Croizet, 2011; Hyde & Mertz, 2009; C. Logel et al., 2009). Achievement gaps by social group are seen internationally as well. For example, there are achievement gaps between Black and White students in Canada (Duffy, 2004), socioeconomic groups in France (Croizet & Millet, 2011), and Christians and Muslims in the Netherlands (Levels & Dronkers, 2008).

The same pattern has emerged in Sweden, which was one of the Western world's best school systems with regard to equality in the early 1990s. However, there has been a substantial increase in achievement gaps between students of different social groups, in addition to a general decline in student performance (OECD, 2015; Skolverket, 2012). Students with parents with higher education and/or higher income earn higher grades than students from less educated and/or poorer families. The national average of students who fail to qualify for high school after grade nine was 14 percent in 2015. For students with parents with pre-high school education only, this number was 48 percent (Skolverket, 2015). Not qualifying for high school at this age tends to lead to long-term consequences in life outcomes. Further, when compared with students born in Sweden of parents born in Sweden, students born in other countries and students with a parent born in another country earn lower grades (Skolverket, 2012). Regarding higher education, there are considerable gender gaps: there are more women than men studying at university (60% compared with 40%) but technical higher education programs, such as engineering, are highly male dominated (Statistiska centralbyrån, 2015).

There are many different factors that may contribute to academic achievement gaps. For example, children raised in low-income families often have less access to educational resources and mothers more often encourage their sons than their daughters to work hard in math and science (Eccles, Jacobs, & Harold, 1990). Social-

belonging interventions were developed in response to the inequality in education settings, with the hypothesis that students of negatively stereotyped and underrepresented groups more often experience concerns about belonging uncertainty and that this undermines their motivation and achievement (Walton & Carr, 2012). If belonging uncertainty contributes to academic achievement gaps, interventions which enhance sense of belonging in students that are part of negatively stereotyped or underrepresented groups could not only improve individual student's academic outcomes, but also equality in educational settings and, in the long-run, in society in general.

## *3.2 Social identity threat*

All of us have several different group identities; we identify ourselves, or are perceived, as members of different social groups. For instance, social groups may be defined by gender, ethnicity, religion, socioeconomic status, or abilities. *Social identity threat* emerges in situations where people perceive that they may be negatively evaluated on the basis of their group identity, for example, that they are viewed as being less competent in a setting because of their gender or ethnical background. Being a member of a group with a history of being discriminated, stigmatized, or negatively stereotyped regarding one's ability makes worrying about being judged or mistreated understandable. To trust someone who later proves to be untrustworthy can be costly (Cohen & Steele, 2002). To commit oneself to a relationship means investing emotional, psychological, and pragmatic resources, and when assuming fair treatment, experiences of mistreatment may not only be costly, but also emotionally painful. To avoid this, it is reasonable that students may adopt the hypothesis that they could be mistreated in academic settings until proved otherwise. Students of negatively stereotyped or underrepresented groups have been described as experiencing a heightened sense of vigilance for cues in the environment that may signal if they are valued, included, and respected (Cohen & Garcia, 2008; Davies, Spencer, Quinn, & Gerhardstein, 2002; Murphy, Steele, & Gross, 2007; Murphy & Taylor, 2012). For example: In the United States, Black students are negatively stereotyped as having less ability than White students in academic settings. This stereotype may cause a Black student to question if ambiguous information, such as critical feedback from a teacher, signals a desire to help him/her or is due to a bias against his/her racial or ethnic group (Yeager et al., 2014). This questioning does not arise to the same extent in White or majority-group students.

More precisely, identity threat has been described as arising when situational cues signal that one's social identity matters in a specific context and when outcomes may depend on it (Inzlicht & Schmader, 2012). Both laboratory studies and studies in the real world (field studies) have shown that, for example, the indication of one's gender or ethnicity in demographic questions raises the salience of stereotypes related to the group memberships and reduces performance (Schmader, Johns, & Forbes, 2008; Steele & Aronson, 1995). Also, identity threat may increase when potential for evaluation is highlighted, for example telling people that a test will "reveal their

strengths and weaknesses" (Johns, Inzlicht, & Schmader, 2008; Marx & Stapel, 2013) or when they know that they will receive feedback on their performance after a test (Martens, Johns, Greenberg, & Schmiel, 2006). In addition, cues such as the proportion of people with different group memberships can have significant effects on performance of members of underrepresented groups. For instance, the number of men and White people in a setting can affect performance of women and racial minorities, respectively (Inzlicht & Ben-Zeev, 2000, 2003; Sekaquaptewa & Thompson, 2003). In one experiment, the cue of numeric representation was manipulated by letting a woman take a math test in a room with two other test-takers, who either were two women, one man and one woman, or two men. The performance of male test-takers did not vary between conditions, but the performance of women decreased linearly with the number of male test-takers (Inzlicht & Ben-Zeev, 2000). In addition, other people's behavior can trigger social identity threat. For example, women may perceive cues about the potential for negative treatment and stereotyping from men's body language (Logel et al., 2009).

Different cues in the environment may affect performance by generating concerns of different kinds. For example, they may raise concerns such as *stereotype threat* – the fear of confirming a negative stereotype of one's social group – and *belonging uncertainty* – doubting whether one is socially accepted by others and whether one fits in or not[2]. These concerns may cause stress which can deplete mental resources, undermine performance, and erode the sense of comfort, belonging and trust, and contribute to – or even create – gaps in achievement and career aspirations, as well as in well-being, between social groups (Murphy & Taylor, 2012).

### 3.2.1 Stereotype threat

Stereotype threat arises in situations where individuals are at risk of confirming a negative stereotype about their social group (Steele & Aronson, 1995; Steele, Spencer, & Aronson, 2002). For example, there are negative stereotypes impugning Black people's intellectual ability, and in a situation where this ability is required to be displayed, a Black student may experience a fear of confirming this stereotype. This fear can hijack cognitive resources necessary for optimal performance and as a consequence it may lower the performance and thus confirm the stereotype. There is a large amount of research on the effects of stereotype threat on performance (an overview of the field is presented in Inzlicht & Schmader, 2012). For example, stereotype threat negatively affects performance among non-Asian ethnic minority groups in standardized testing (for a meta-analysis, see Walton & Spencer, 2009). In addition, it has been seen to undermine women's performances in math and science, elderly people's memories, and White people's athletic performances. To some extent,

[2] Other identified concerns linked to identity threat are: worries about authenticity, trust, and fairness, discrimination and devaluation, marginalization, "ghettoization", and social exclusion. These are further described in Chapter 2 in the book 'Stereotype Threat. Theory, process, and application.' (Inzlicht & Schmader, 2012).

everyone is vulnerable to stereotype threat, as everyone belongs to at least one group that is negatively stereotyped in some domain. For example, White male students exceling in math underperform when faced with the stereotype that they do not have as high math ability as Asian American males (Aronson et al., 1999). Similarly, men underperform on tests on social-emotional intelligence, knowing that they are stereotyped to not be very good at recognizing other's emotions (Koenig & Eagly, 2005). This highlights the salience of situational cues for identity threat and its impact on performance; it creates differences that are not due to amount of ability or personal characteristics, but rather to psychological forces evoked by the environment.

### 3.2.2 Belonging uncertainty

To be a member of an underrepresented or a group stereotyped as less qualified, less able, and less worthy than others has been suggested to give rise to *belonging uncertainty* (Walton & Carr, 2012). In this state, people are more vigilant for cues in the environment that may signal that they do not belong. They have a heightened sensitivity of the qualities of their social bonds and question whether or not they fit in and are valued by others. Belonging uncertainty can occur regardless of objective prejudice in the environment; the worry, doubt, and increased vigilance for cues confirming or disconfirming that one's identity is threatened is enough to have negative effects on motivation and achievement. Belonging uncertainty has been suggested to contribute to the academic achievement gaps between ethnic groups, between women and men in male-dominated education programs, and between students with different socioeconomic background in the United States (Spitzer & Aronson, 2015).

## *3.3 How social identity threat can affect motivation and achievement*

How can social identity threat reduce one's interest in learning and pursuing in education? Longitudinal field studies suggest that stereotype threat may lead students to question their belonging in academic settings (Good, Rattan, & Dweck, 2012; Mendoza-Denton, Downey, Purdie, Davis, & Pietrzak, 2002). For example, there is a stereotype that females are inferior to males in domains such as math and science – a stereotype girls know already in second grade (Cvencek, Meltzoff, & Greenwald, 2011). In addition, there are other stereotypes such as 'people who succeed in pSTEM fields (physical science, technology, engineering, and math) are socially isolated males' and 'people who succeed in pSTEM fields were born geniuses'. These stereotypes may lead women to question their belonging, which may result in decreased interest in pursuing studies in these domains (Diekman, Brown, Johnston, & Clark, 2010; Leslie, Cimpian, Meyer, & Freeland, 2015; Logel et al., 2009).

Stereotypes may be evoked by situational cues. For example, experimental studies have shown that stereotypical objects in a computer science classroom (e.g., Star Trek posters, video games) undermine female students' sense of belonging and interest in

computer science when compared with neutral objects (e.g., nature poster, phone books) (Cheryan, Plaut, Davies, & Steele, 2009; Master, Cheryan, & Meltzoff, 2016).

Further, how can belonging uncertainty affect academic achievement outcomes? Students who feel that they belong – who feel supported, respected, and socially connected to others in school or at university – also feel trust in their teachers and peers. This enables them to engage more fully in learning and in building important relationships. When encountering adversities, they see it as a normal part of being a student, whereas individuals experiencing belonging uncertainty more often interpret adversities as signs that they may not fit in. These interpretations moderate different behavioral responses which lead to different outcomes in performance (Cohen & Garcia, 2008). A model of how students' sense of belonging affects academic outcomes is presented in Figure 1.

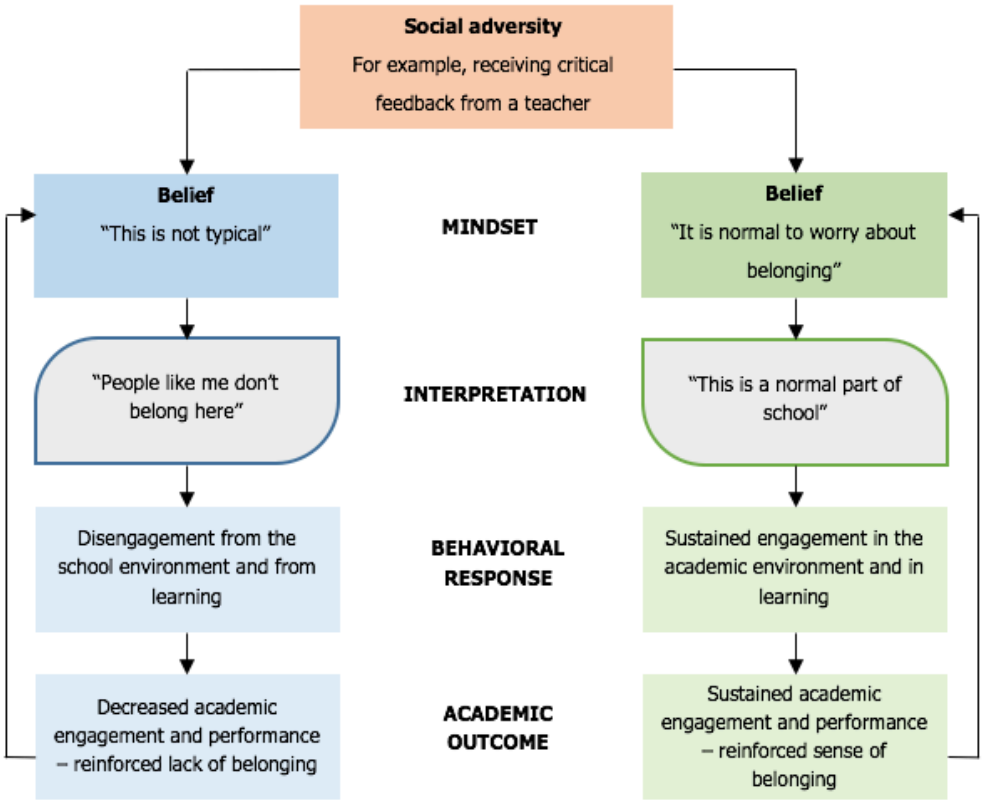


Figure 1. A model of how sense of belonging affects academic outcomes[3].

The model illustrates that interpretations of an event are derived from a particular view of what is normal in the context, a view which can be described as a mindset or lay theory. Changing the lay theory can therefore have enhancing effects on students' sense of belonging, motivation, and achievement.

[3] Figure 1 is based on a figure provided by Mindset Scholars Network at http://mindsetscholarsnetwork.org/wp-content/uploads/2015/09/What-We-Know-About-Belonging.pdf

## 3.4 Psychological interventions to improve student outcomes

In the United States, experimentally tested psychologically-based interventions to improve student outcomes have generated high levels of interest in the general public and in the social sciences. From this field of research, two insights have been suggested as particularly important to education policy: Firstly, students perceive the same classroom differently. This means that regardless of pedagogical methods, social climate, or students' actual knowledge and abilities, individuals will interpret the same situation differently and these interpretations will lead to different outcomes. Secondly, well-planned interventions can trigger lasting improvements in students' motivation, achievement, and well-being by changing the way students perceive themselves and their environments (Cohen & Garcia, 2014; Spitzer & Aronson, 2015; Walton, 2014). This psychological approach has been described as complementary to structural approaches to improve student outcomes because they target psychological threats, such as social identity threat, which may raise concerns regarding belonging uncertainty, which may prevent positive forces in the person and in the environment from having their full impact on learning and achievement (Cohen & Garcia, 2008; Garcia & Cohen, 2011). For example, a student may have the will and ability to excel in school and a well-structured learning environment with competent teachers, but belonging uncertainty may hinder the student from building valuable relationships, from believing he/she can succeed, from learning, and ultimately, it may impair academic persistence and performance (Cohen & Garcia, 2008; Garcia & Cohen, 2011; Inzlicht & Schmader, 2012).

## 3.5 Aim of the present review

The importance of social belonging for students' well-being and academic motivation and achievement, and the possibility of intervening to reduce belonging uncertainty make it interesting to sum up the existing research on interventions. The purpose of this review was to present an overview of current research on experimental interventions on social belonging among students of all ages. Experimental research enables conclusions to be drawn regarding how to affect belongingness, in contrast to other methods that are limited to revealing associations and indications of possible causal relations.

The main research question that guided the literature search was: What are the outcomes of experimentally tested social-belonging interventions in educational settings? Examining the literature, we noticed that there were few studies on interventions explicitly targeting social belonging, but several studies tested if other kinds of psychological interventions did affect social belonging. Thus, another question arose: What kind of experimentally tested interventions in educational settings, which have not explicitly targeted social belonging, have been seen to affect students' sense of social belonging?

# 4 Method

The literature review was conducted according to the guidelines of Gough, Oliver, and Thomas (2012) and the PRISMA statement (Moher, Liberati, Tetzlaff, Altman, & Group, 2009).

## *4.1 Search strategy*

As we expected to find few studies on social-belonging interventions compared to previously reviewed mindset interventions and autonomy-supportive interventions (Miller, Rudman, Högman, Gustavsson, 2016; Gustavsson, Jirwe, Miller, Rudman, 2016), we decided to develop a broader search strategy for the present review. Based on the study aim and after consultation with search laboratory expert librarians at Karolinska Institutet University Library, a search strategy with the following three components was adopted: (1) the interventions of interest (i.e. social belonging), (2) the methods of interest, and (3) the subjects and setting of interest. A search was performed on 2016-06-09 in the databases *Web of Science*, *Psychinfo*, and *Eric*. Web of Science is a database of a large amount of multidisciplinary research, while Psychinfo covers psychological research, and Eric educational research. The best key words were chosen after a joint discussion and modified for each database according to recommendations from search experts at Karolinska Institutet University Library. To cover variations in the grammatical form of some key words, truncation was used. In addition to the data base searches, to ensure the latest research on social-belonging interventions was included on the date 2016-06-09, we searched for articles on the web-pages of the leading researchers known to us in the field:

Geoffrey Cohen https://ed.stanford.edu/faculty/glc
Carol Dweck https://psychology.stanford.edu/cdweck
Gregory Walton http://gregorywalton-stanford.weebly.com/
David Yeager
http://liberalarts.utexas.edu/prc/directory/faculty/profile.php?id=yeagerds

We also included articles from the meta-analysis of Lazowski and Hulleman (2016) and searched for articles of interest referred to in the examined literature.

## *4.2 Inclusion and exclusion criteria*

Articles were included based on the following inclusion criteria: (1) the study included an intervention aiming at enhancing social belonging or an intervention evaluated by an outcome of social belonging, (2) the study had an experimental design, i.e. participants were randomized to an intervention or control group, and (3) the intervention was performed on students or teachers in an academic setting. No limits were set as for age of the students or for the sample size of the studies. Exclusion criteria were: (1) language (only articles written in English or the Scandinavian languages Swedish, Norwegian, or Danish were included), (2) non peer-reviewed

article (e.g., books, dissertations, or other articles), and (3) non-representative sample (e.g., children with disabilities only).

Social belonging in educational settings has been defined and assessed in a variety of ways (Allen & Bowles, 2012). For example, social belonging has been examined in the form of school belonging, belonging uncertainty, belonging to the university community, and social fit. In the present review, we included several conceptualizations seen to reflect experience of being socially connected and of a sense of fit into the current context.

## *4.3 Identification and selection of studies*

The searches resulted in 853 (+ 4) articles, of which 11 articles were included in the present review. Figure 2 presents the steps in the process of selection for inclusion. The main reasons for exclusion were that articles were duplicates, did not include an experimental intervention, or described studies outside academic settings. In addition, we found several dissertations on social belonging in academic settings (Ahlqvist, 2015; Heinze, 2013; Jordan, 2015; Ricard, 2014; Urciuoli, 2007). The four web-pages generated one additional article, the meta-analyses of two articles, and one additional article was found because it was referred to in the examined literature.

The literature search:

*Block 1* (Intervention of interest): sense of belonging OR belongingness OR social belonging OR belonging uncertainty

*Block 2* (The methods of interest): intervention* OR trial* OR experiment* OR program*

*Block 3* (The subjects and setting of interest): student* OR teacher* OR school* OR university* OR college* OR higher education

The searches all contained a combination of the three blocks, that is, the three blocks were combined with AND in the search strings.

**Number of search results from databases**: 853
Duplicates: 135
Excluded by title: 405
Excluded by abstract: 282
Excluded by full text: 27
Relevant studies found in original search: 7
Additional articles identified through other sources: 4
Relevant studies in final analysis: 11

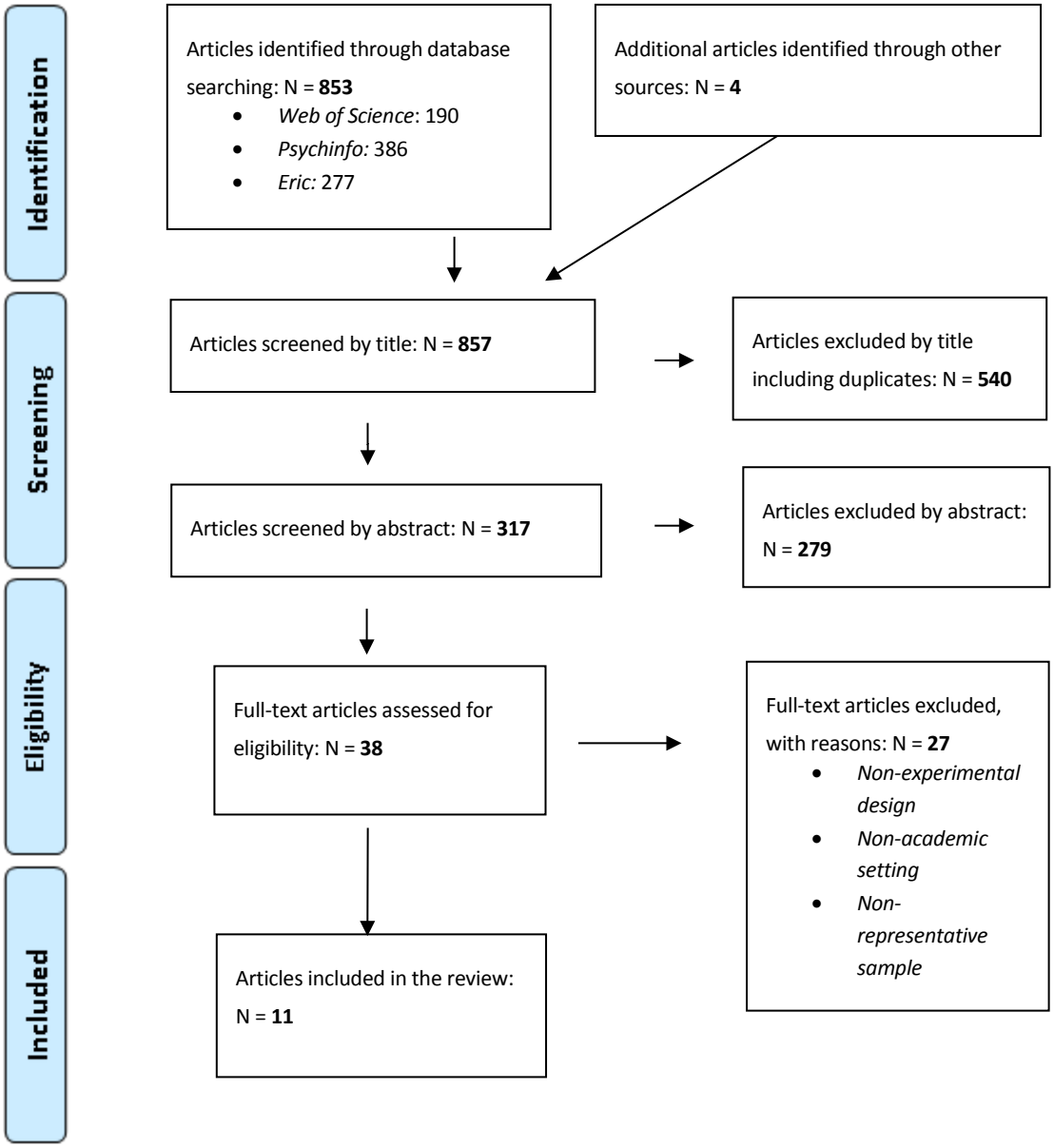


Figure 2. PRISMA flow diagram of the screening process of the literature.

# 5 Results

Of the 11 articles (with 14 studies) included in the present review, 5 articles (7 studies) described outcomes of social-belonging interventions and 6 articles (7 studies) described other interventions that were evaluated by outcomes such as sense of belonging. The main characteristics of the included studies are presented in Table 1 (social-belonging interventions) and Table 2 (other interventions). The studies included a total of 12,430 students ranging in age from middle school to higher education. All interventions targeted students only, except for the intervention tested in Gehlbach et al. (2015), which included the manipulation of both students and teachers. Twelve of the 14 studies were experimental field studies. This means that participants were randomly assigned to one or more intervention groups designed to affect certain outcomes and one or more control groups that were either given an intervention without the key components of the main intervention (active control group) or no intervention at all (passive control group). Further, the experimental field interventions were conducted in real world settings, for instance in the classroom, or presented as an educational activity online. This increases the ecological validity. However, we also included two laboratory experiments (Walton & Cohen, 2007, 2011) as they included real world outcomes (e.g., grades) and were identified as key articles in the field. One of the experimental field studies compared two groups receiving the same intervention but at different time points (Cook et al., 2012 [Study 2]). In this study, the timing is the only variable that can be evaluated as a possible influencing factor. In addition to the 14 empirical studies, we have summarized the findings from social-belonging interventions from the meta-analysis conducted by Lazowski & Hulleman (2016).

## *5.1 The empirical studies*

### 5.1.1 Overall results

Overall, we found evidence showing that psychological interventions on social belonging can affect students' sense of belonging in educational settings, as well as outcomes on motivation, study engagement, and academic achievement. In addition, a variety of interventions not explicitly designed to affect social belonging were found to have positive effects on sense of belonging as well as academic achievement.

All the studies but one (Hausmann, Ye, Schofield, & Woods, 2009) revealed the same pattern of interventions having enhancing effects on belongingness as well as academic achievement among students of negatively stereotyped groups, while having either no effect or slightly deteriorating effects on outcomes of students representing the norm. This will be further described in the following sections.

#### *5.1.1.1 Effects on students' sense of belonging*

Different conceptualization of sense of belonging was assessed as outcomes of the interventions. For students of negatively stereotyped groups or disadvantaged students, social-belonging interventions resulted in a higher sense of academic fit (including

social fit) (Walton & Cohen, 2007), less belonging uncertainty (Walton & Cohen, 2011), and higher social and academic integration (e.g., they made more friends, were more likely to have developed close mentor relationships, and were more involved in extracurricular activities) (Yeager et al., 2016). Other interventions not targeting social belonging were seen to have a maintaining effect on the sense of academic belonging of Black students, while their controls experienced a drop across 7th and 8th grade (Cook et al., 2012) and enhanced female university students' sense of belonging (Rosenthal, Levy, London, Lobel, & Bazile, 2013; Shin, Levy, & London, 2016). Among women in a higher education engineering program, a social-belonging intervention had a positive effect on integration into engineering, for instance, by increasing friendships with male engineers (Walton, Logel, Peach, Spencer, & Zanna, 2015).

For White students, only one intervention increased their sense of belonging (belonging to the university community) (Hausmann et al., 2009), and this intervention had no effect on Black students. Surprisingly, in this study, the belonging intervention and the control intervention affected sense of belonging equally, when compared with not receiving any intervention (i.e., compared with the passive control group). It should be noted that this intervention differed completely in its content from the other six social-belonging interventions. Moreover, in the study by Walton and Cohen (2007), the intervention aiming to decrease belonging uncertainty actually lowered White students' sense of academic fit (including social fit).

A few studies examined sense of belonging in relation to perceived daily adversities or academic performance. The results indicated that the interventions had a stabilizing effect on Black students' sense of belonging, as the level of sense of academic fit became independent of experienced daily adversities (Sherman et al., 2013; Walton & Cohen, 2007, 2011) and independent of academic performance (Cook et al., 2012). In these studies, untreated Black students (students in the control groups) had a relatively high sense of academic fit when things were going well, but on days with more adversities, or when their performance decreased, their sense of fit dropped. Contrary, treated Black students (students who received the interventions) developed a more sustained sense of fit, even when encountering setbacks. In general, White students' sense of belonging was not seen to be dependent on daily adversities or performance from the start and thus, for them, the intervention had no effect on the relationship between belongingness and setbacks. The intervention aiming to improve relationships between students and teachers by enhancing perceived similarity had no effect on either students' or teachers' perception of the quality of their relationships (Gehlbach et al., 2016).

#### *5.1.1.2 Effects on academic achievement*

When it comes to academic achievement, the interventions decreased and in some cases even eliminated the achievement gap between Black and White students (Walton & Cohen, 2007, 2011), and Latino American and White students, respectively

(Sherman et al., 2013). The same effect was found for achievement gaps between women and men in STEM-fields (Walton et al., 2015), between underserved (primary Black and Latino American) students and well-served (White and Asian) high school students (Gehlbach et al., 2016), and college students from socially and economically disadvantaged and advantaged backgrounds (Yeager et al., 2016). Lastly, a reduction was seen in the achievement gap between first year college students who did not have parents with 4-year degrees (first-generation students) and students who had at least one parent with a 4-year degree (continuing-generation students) (Stephens, Hamedani, & Destin, 2014).

In addition to sense of belonging and academic achievement, interventions also enhanced several other outcomes of motivation, engagement, well-being, and overall health. Several studies evaluated long-term effects, particularly on grades (Cook et al., 2012; Walton & Cohen, 2007; Yeager et al., 2016). The longest follow-up assessment was performed over a period of three years (Walton & Cohen, 2011).

### 5.1.2 What are the outcomes of experimentally tested social-belonging interventions in academic settings?

Out of the seven studies on social-belonging interventions (Table 1), two laboratory experiments and four field experiments aimed at mitigating belonging uncertainty by conveying a message of social adversities and worries about belonging as (a) common among all students and (b) that these worries will lessen with time. Negatively stereotyped or underrepresented students receiving the interventions were more engaged in their studies, more resilient, and received higher grades (Walton & Cohen, 2007, 2011; Walton et al., 2015; Yeager et al., 2016). They also tended to persist in higher education to a greater extent (Yeager et al., 2016). Further, the interventions were found to enhance academic fit, confidence regarding academic ability, and social and academic integration (Walton & Cohen, 2007; Walton et al., 2015; Yeager et al., 2016) and decrease belonging uncertainty, cognitive accessibility of negative stereotypes, and self-doubt (Walton & Cohen, 2011). They also helped students to view their daily adversities and stressors as challenges they could manage (Walton et al., 2015). On the contrary, in one study, White students in the treatment group (the group who received the social-belonging intervention) experienced lower academic fit. They also earned lower grades when compared with students in the control group, but not when compared to the campus-wide average in GPA among White students.

A few studies explored if the interventions affected health and psychological well-being. They did. Three years after receiving a social-belonging intervention, Black university students reported better health, fewer visits to the doctor, and higher levels of happiness (Walton & Cohen, 2011). This eliminated the racial gap in health and happiness seen in the control group. In addition, these studies showed that for Black college students, the intervention helped to stabilize a sense of belonging and disconnect it from perceived adversities (Walton & Cohen, 2007, 2011).

The study by Hausman and colleagues (2009), included from the meta-analysis of Lazowski and Hulleman (2016), describes another kind of intervention that aimed at enhancing all students' sense of belonging by written communication conveying that they were valued members of the university community and by presenting them with small gifts with an insignia from the university. This intervention increased sense of belonging in White students, but not in Black students, and it did so both in the intervention group and in the active control group receiving a similar intervention but without the characteristics anticipated to influence sense of belonging. The intervention had no significant effect on motivational outcomes (e.g., social integration and goal commitment) or academic achievement (college enrollment and grades).

### 5.1.3 What kind of experimentally tested interventions in academic settings, which have not explicitly targeted social belonging, have been seen to affect students' sense of social belonging?

Aside from interventions explicitly targeting social belonging, we found seven studies on interventions which in different ways aimed at enhancing students' motivation and academic achievement that also explored the effect of the intervention on sense of belonging (Table 2). Four kinds of interventions were identified in these studies: *values affirmation, role models, difference-education,* and one that targeted *perceived similarity in teacher-student relationships*. Moreover, in four of the social belonging studies described above, a social-belonging intervention was tested along with one or three other kinds of interventions that were also seen to have positive effects on a belongingness outcome, i.e.: *growth mindset, critical feedback,* and *cultural fit* (Walton et al., 2015; Yeager et al., 2016) (Table 1). As the content of the interventions diverged substantially, we will here provide a short description of their main content and main results.

#### *5.1.3.1 Values-affirmation interventions*

In the four studies on values-affirmation interventions (Cook et al., 2012; Sherman et al., 2013; Walton et al., 2015), students were presented with a list of values, including athletic ability, creativity, and religion, and were asked to indicate how important each value was to them. They were then asked to describe in writing why their top-rated values were important to them. They were instructed to focus on their thoughts and feelings (and not on grammar or spelling). An example excerpt from a student affirmation essay read "I love my friends. I love my family and I never want to lose them." This exercise was administered repeatedly during the school year.

The values-affirmation interventions had positive effects on Black students' sense of academic belonging, including social belonging (Cook et al., 2012 [Study 1]), and Latino American students' sense of academic fit, including school belonging (Sherman et al., 2013). They also enhanced said students' grades. In addition, one study compared the effects of values-affirmation interventions given early in the first semester of the 7$^{th}$ grade with those given approximately four weeks later. Receiving

the intervention early improved low-performing Black students' sense of academic belonging and all Black students' grades. However, the second intervention was more effective on White students' sense of academic belonging, and there was no effect of timing on the White students' grades (Cook et al., 2012 [Study 2]). In the study by Walton et al. (2015), the social belonging and values-affirmation intervention was equally effective in increasing grades among women in male-dominated subject majors in an engineering program. Furthermore, both interventions were equally effective in enhancing women's experiences as reported in their daily diaries: the interventions helped them to view daily adversities as less important, to express greater confidence in handling school stress, and to report higher and more stable self-esteem. For these three measures, the interventions eliminated the gender gaps that were seen among controls. Finally, they both improved women's felt experience in engineering and women's confidence in their prospects of succeeding in engineering. However, effects differed regarding friendships, implicit norms about female engineers, and gender identification.

#### *5.1.3.2 Role-model interventions*

In the two studies on role-model interventions (Rosenthal et al., 2013; Shin et al., 2016), students participated in an online study where they were administered different measures regarding their college experience. Students in the intervention group were additionally exposed to brief biographical description of academically successful people with counter-stereotypical backgrounds (e.g., a Black female biology professor). The texts were written in the form of newspaper articles and were designed to highlight similarities between the role models and students, as well as to be inspiring and relevant. As a cover story, participants were asked to read the articles and pay attention to their content and journalistic style. Participants in the control groups only completed study measures.

In both studies, exposure to role models increased treated students' sense of belonging as well as perceived identity compatibility and interest in pursuing studies in pSTEM fields (Shin et al., 2016) and in pre-medical school (Rosenthal et al., 2013). It should be noted that in Rosenthal et al. (2013), study participants were females only, as the intervention was developed as a response to the gender-related challenges women face in the medical field. Outcomes were assessed immediately after the interventions.

#### *5.1.3.3 Difference-education interventions*

The difference-education intervention was developed to reduce the social-class achievement gap between first-generation students (students without a parent with a 4-year degree) and continuing-generation students (students with at least one parent with a 4-year degree) (Stephens et al., 2014). During the first months of college, participants were invited to attend panel discussions about college adjustment. In the experimental and control group, the panelists were the same, constituting upper-class students with different backgrounds (three first-generation students and five continuing-generation students), but during the panel discussion they conveyed

different messages in the two conditions. In the difference-background condition, the panelists highlighted how their background mattered for their college experience. For example, a first-generation panelist's story was "Because my parents didn't go to college, they weren't always able to provide me with the advice I needed. So it was sometimes hard to figure out which classes to take and what I wanted to do in the future. But there are other people who can provide that advice, and I learned that I needed to rely on my adviser more than other students". An example of a continuing-generation panelist's story was: "I went to a small private school, and it was great college prep. We got lots of one-on-one attention, so it was a big adjustment going into classes with 300 people. I felt less overwhelmed when I took the time to get to know the other students in the class". In the control condition, panelists provided general content that was not linked to their social-class backgrounds. After the panel discussion, participants completed a study survey and performed a saying-is-believing exercise in the form of video testimonials addressed to next year's new students.

At the end of the first college year, students who had received the difference-education intervention reported a higher sense of social fit and higher number of maintained relationships when compared with students in the control condition. In addition, all treated students experienced higher well-being and greater academic identification. When it comes to academic performance, the intervention increased first-generation students' end-of-year GPA. This effect was mediated by the tendency to seek out college resources, such as contacting professors or seeking extra help. The more they reported having sought out college resources, the higher grades they earned. The intervention helped reduce the social-class achievement gap by 63 percent. The intervention had no effect on perceived stress and anxiety (including psychological distress and social-identity threat), perceived academic preparation, or social support.

#### *5.1.3.4 Perceived similarity in the teacher-student relationships*

Gehlbach et al. (2015) developed an intervention to improve relationships between teachers and students as well as academic achievement by leveraging perceived similarities both among teachers and ninth-grade students. At the beginning of the school year, students and teachers visited the school's computer laboratory to complete a get-to-know-you survey. The survey included questions such as what the most important quality in a friend is, which class format is best for student learning, what they would do if the principal announced that they had a day off, which foreign languages they spoke, and so on. A few weeks later students and teachers received feedback sheets composed by the research group on the basis of the get-to-know-you surveys. The feedback sheets to the students contained lists of five things students had in common with their teachers (Student Treatment group) or five things that students had in common with students at another school (Student Control group). The teachers received lists with five things they had in common with each student randomized to a Teacher Treatment group (constituting half of the teacher's class). They did not receive feedback on students in the Teacher Control group. Students and teachers also responded to some brief questions on their feedback sheets (e.g., "Looking over the

five things you have in common, please circle the one that is most surprising to you."). The aim was to stimulate deeper consideration and better recollection of the similarities.

The intervention had no effect on White or Asian American students, who were described as typically well-served by the school. On the other hand, the intervention had some effect among the remaining students, who were mainly Black and Latino American students described as "underserved", as they typically faced more challenging circumstances at home, school, and throughout their community. The intervention on students and teachers increased students' and teachers' perceived similarities, respectively. Teachers also reported having interacted more with underserved students in the Teacher Treatment group. The results tend to show positive effects of the intervention on perceived teacher-student relationships and grades, but there were no statistically significant differences between treated and untreated groups. The intervention had no effect on student class attendance.

#### *5.1.3.5 Growth-mindset interventions*

A growth-mindset intervention was tested along with the social-belonging intervention in two studies in Yeager et al. (2016 [Study 1 and 2]). All interventions tested in the three studies by Yeager et al. (2016) had similar structure and extension. The growth-mindset intervention conveyed the message that intelligence is a malleable quality that can be developed through effort and the use of effective strategies on challenging tasks. Students first read an article summarizing scientific research supporting this idea. Next, students performed a saying-is-believing exercise in the form of essays conveying this idea to future students. In the first study on students from high-performing urban charter schools, there was no effect of the growth-mindset intervention on student achievement or social and academic integration. However, in the second study on incoming students at a high-quality public university, the growth-mindset intervention was equally effective as the social-belonging intervention, and as the two of them combined. All three conditions increased disadvantaged students' social and academic integration and college enrollment during freshman year (from 69% in the control group to 73%). This reduced the gap between disadvantaged and advantaged students by 40 percent.

#### *5.1.3.6 Critical-feedback intervention*

A critical-feedback intervention and a cultural-fit intervention were tested along with a social-belonging intervention in the third study in Yeager et al. (2016). Students read upper-class students' stories conveying the message that critical feedback from teachers reflects their high standards and confidence in that students can meet those standards - not biases or devaluation. It was developed to encourage them to use feedback to learn and grow and not see criticism as a sign of them not belonging. The critical-feedback intervention was equally effective as the social-belonging intervention. They both enhanced disadvantaged students' first year college GPA as well as social and academic integration.

#### *5.1.3.7 Cultural-fit intervention*

The cultural-fit intervention was tested for the first time in the third study by Yeager et al. (2016). It was developed in response to previous research showing that many first-generation and ethnic minority students experience a cultural mismatch in higher education (Stephens, Fryberg, Markus, Johnson, & Covarrubias, 2012; Stephens et al., 2014). Colleges and universities often focus on independent ways of being (e.g., "follow your own star" or "customize your major"). On the contrary, many underrepresented students come from more interdependent cultural backgrounds. This misfit may undermine a sense of belonging in college among first-generation and minority students. Thus, the culture-fit intervention aimed at enhancing students' sense of belonging by emphasizing that students can maintain interdependent relationships with friends and family and at the same time develop interdependent relationships in college. These messages were delivered in the form of stories from senior students followed by the same saying-is-believing exercise used in the social belonging and critical-feedback intervention. The cultural-fit intervention was equally effective as the social-belonging intervention. They enhanced disadvantaged students' first year college GPAs as well as social and academic integration.

**Table 1.** Description of the 7 empirical studies on social-belonging interventions.

| **Author<br>Year<br>Title** | **Study participants<br>Country** | **Main focus of intervention<br>Study design<br>Content of intervention<br>Administration** | **Mediation variables** | **Time point and outcome measures** | **Results** | **Notes<br>&<br>Limitations** |
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| (Hausmann et al., 2009)<br><br>*Sense of Belonging and Persistence in White and African American First-Year Students* | N = 356<br><br>First year college students.<br><br>USA | Belonging to the university community.<br><br>Field experiment with random assignment to sense of belonging group, active control group, and passive control group.<br><br>Students in the belonging group received seven written communications from university administrators emphasizing that they were valued members of the university community and gifts (for example, baseball caps, magnets, etc.) that displayed the university's name, logo, and/or colors. There were | A motivational model of student persistence was tested. See under Notes. | 1 year:<br>College enrollment in the spring semester in the second year<br><br>1 – 2 years:<br>GPA at the end of the fall semester of the second year (or at the last semester available)<br><br>Self-report survey:<br>Sense of belonging, financing college, encouragement from family and friends, social integration, academic integration, institutional commitment, goal commitment and intention to persist. | The belonging intervention and the control intervention both increased sense of belonging for White students but not for Black students. The interventions had no effect on perceived difficulty in financing college, encouragement from family and friends, social integration, academic integration, institutional commitment, goal commitment, intention to persist or actual persistence. | An additional theoretical model of student persistence was tested. Sense of belonging was suggested to have a direct positive effect on students' institutional commitment and indirect effects on intentions to persist and actual persistence.<br><br>Limitations: The content of this intervention differs a lot from the rest of the social-belonging interventions. It was not aimed at de~~in~~creasing belonging uncertainty in students of negatively stereotyped groups.<br><br>Time point for assessment of sense of belonging and other self-report measure are not presented. |

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| | | 3-5 weeks between each mailing.<br><br>Students in the active control group received the same communication but from the research team, as well as gifts lacking university insignia (name, colors, etc.)<br><br>Administered by researchers and university staff. | | | | |
| (Walton & Cohen, 2007)<br><br>*A question of belonging: Race, social fit, and achievement* | N = 37<br><br>First year college students.<br><br>USA | Social belonging.<br><br>Laboratory experiment with random assignment to intervention or active control group.<br><br>One session. Students read surveys communicating that during the first year of college, most students, regardless of race, worry about belonging and that these worries lessen with time. They thereafter performed "saying-is- | None. | Immediately after the intervention: Academic fit (including social fit, self-efficacy, academic identification, enjoyment of academic work, and potential to succeed in college), possible academic selves, evaluative anxiety, academic challenge-seeking, evaluative anxiety, challenge-seeking course selection. | Black students in the treatment group reported greater academic fit, higher potential to succeed in college, higher academic challenge-seeking.<br><br>Further, in the daily diaries, they reported higher potential to succeed in college, and more engagement in achievement behavior. For example, they studied longer (OR = 16.3) and sent more e-mails to professors (OR = 21.8). | This article is a key article in the field. It describes how belonging uncertainty may undermine minority students' academic achievement.<br><br>Treated White students did not perform significantly lower than the campus wide average.<br><br>Limitations: Laboratoryexperiment. Thus, it is unknown if it would be effective if delivered by school staff and thereby be ecologically valid. Small sample size. |

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| | | believing" writing and speech exercises.<br><br>Administered by researchers. | | Daily surveys for 7 days post-intervention: Fluctuation of social fit, self-efficacy, academic potential, achievement behavior, and level of adversity.<br><br>After approx. 1 year: Grade Point Average (GPA) | The intervention also sustained Black students' sense of social fit on adverse days, i.e., it became less dependent on experienced adversities.<br><br>After approx. 1 year, Black students in the treatment group had improved their college GPA more than controls (OR = 7.4)<br><br>For White students, the intervention resulted in lower academic fit as reported in the survey and diaries. White students in the treatment condition also earned lower grades than controls (OR = 4.9). | |
| (Walton & Cohen, 2011)<br><br>*A brief social-belonging intervention improves* | N = 92<br><br>Students in their second semester of the first year at a selective college. | Social belonging.<br><br>Laboratory experiment with random assignment to intervention or active control group. | Daily adversities. | Daily surveys for 7 days post-intervention: Sense of belonging and daily adversities.<br><br>GPA was assessed at 7 time points from freshman to senior year. | Among Black students, the intervention decreased fluctuation in sense of fit with perceived daily adversities as reported in the daily surveys. | Grades of White students rose over time, regardless of if they partook in the intervention or not.<br><br>The intervention eliminated the race gap in self-reported health and happiness. |

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| *academic and health outcomes of minority students* | USA | One session. Students read surveys communicating that during the first year of college, most students, regardless of race, worry about belonging and that these worries lessen with time. They thereafter performed "saying-is-believing" writing and speech exercises. | | Survey after 3 years: Belonging uncertainty Belonging uncertainty, cognitive accessibility of negative racial stereotypes, self-doubt self-reported health, visits to doctor, and happiness. | The intervention increased grades of Black students over time, while there was no improvement for controls.<br><br>By the end of students' senior year, in the intervention group the racial gap in GPA was cut by 79% when compared with controls.<br><br>For Black students, sense of belonging being more independent of daily adversities mediated greater improvement in GPA.<br><br>In the survey after 3 years, treated Black students reported less belonging uncertainty, less cognitive accessibility of negative stereotypes and self-doubt, better health, fewer visits to the doctor and higher levels of happiness than controls. | Participants were unaware of the intervention's effect, which suggested that the intervention did not depend on conscious awareness.<br><br>Limitations: Laboratory experiment. Participants at a selective college. |

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| (Walton et al., 2015)<br><br>*Two brief interventions to mitigate a "chilly climate" transform women's experience, relationships, and achievement in engineering* | N = 228 (92 women and 136 men)<br><br>Students in the first year of a demanding university engineering program.<br><br>USA | Social belonging.<br><br>Field experiment with random assignment to a social-belonging intervention, a values-affirmation intervention and an active control group.<br><br>A classroom session, 1 x 45 min., where students listened to recordings of senior students who described their college experiences. The material emphasized that both men and women worry about their social belonging at first, but that these concerns dissipate with time. Next, a “saying-is-believing” writing exercise was performed. | None. | Survey immediately after the intervention:<br>Attitudes toward engineering (i.e., experiences and confidence in their prospects of succeeding in engineering).<br><br>Surveys every other day for 12 days shortly after the intervention:<br>How important they perceived negative events as compared with positive events, how confident they were that they could handle school stress, self-esteem.<br><br>Survey in the following semester post-intervention:<br>Friendship groups, implicit norms, gender identification.<br><br>Approx. 8 months: | Among women in male-dominated majors, both interventions improved their felt experience in engineering both immediately after the intervention and in the following semester (OR = 3.4). In the second semester they also were more confident in their prospects of succeeding in engineering (OR = 4.5).<br><br>In the every-other-day surveys, treated women in both the social belonging and values affirmation condition reported that they viewed negative events as less important, they expressed greater confidence in handling school stress, and reported higher and more stable self-esteem compared with controls (OR > 3.6).<br><br>The social-belonging intervention helped women | There were no gender differences in outcomes among women in gender-diverse majors (defined by there being more than 20% women in these majors).<br><br>Limitations: Very selective sample.<br>Authors suggest cautious interpretations of the differences in grades among women in gender-diverse majors in the values affirmation and control condition, as this result was not predicted and no differences for other outcomes were seen. |

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| | | | | First year engineering GPA. | in male-dominated majors to integrate into engineering by increased friendships with male engineers, and they exhibited more positive implicit norms about female engineers.<br><br>The values-affirmation intervention increased gender identification and friendships with female non-engineers among women in male-dominated majors.<br><br>Among women in male-dominated majors, both interventions increased academic achievement (GPA) (OR = 6.6). This eliminated the gender gap that was seen among controls. However, in gender-diverse majors, women in the self-affirmation condition earned lower grades than controls. | |

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| (Yeager et al., 2016) (Study 1) *Teaching a Lay Theory Before College Narrows Achievements Gaps at Scale* | N = 584<br><br>Senior high school students<br><br>USA | Social belonging.<br><br>Field experiment with random assignment to a mindset intervention, a social-belonging intervention, a combined intervention (mindset + social belonging) and an active control group.<br><br>Web-based, consisting of intervention content and a writing task (a "saying-is-believing" exercise), 1 x 25 min.<br><br>Administered by school staff. | Social and academic integration | 6 months follow-up survey:<br>Social and academic integration (e.g., having used academic support services, had joined an extracurricular group, and had chosen to live on campus).<br><br>One year:<br>Full time college enrollment during the first year | The social-belonging intervention and combined intervention (mindset + belonging) increased college enrollment compared with controls (OR = 1.87). The effect was mediated by social and academic integration. Treated students were more likely to have used academic support services, joined an extracurricular group, and chosen to live on campus compared with controls (OR = 4.1).<br><br>There was no effect of the growth-mindset intervention. | Limitations: All students were either racial minority or first-generation students from high-performing urban charter schools. |
| (Yeager et al., 2016) (Study 2) *Teaching a Lay Theory Before College Narrows Achievements Gaps at Scale* | N = 7335<br><br>Incoming students at a high-quality public university.<br><br>USA | Social belonging<br><br>Field experiment with a random assignment to a mindset intervention, a social-belonging intervention, a combined intervention (mindset + social belonging) and an active control group. | Social and academic integration | 6 months follow-up survey:<br>Social and academic integration (e.g., having used academic support services, had joined an extracurricular group, and had chosen to live on campus). | The three intervention conditions were equally effective and increased college enrollment among socially and economically disadvantaged students (OR = 1.23), but not among advantaged students. The effect was mediated by improvement in social and | In addition, a non-randomized intervention was carried out among all incoming students two years later. In this cohort (N = 6244), college enrollment increased among disadvantaged students compared with previous years where no intervention had been performed. The authors conclude that a lay theory |

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| | | Web-based, consisting of intervention content and a writing task (a "saying-is-believing" exercise), 1 x 25 min.<br><br>Administered online for students to complete in their own time. | | One year:<br>Full time college enrollment during the first year | academic integration. | intervention could contribute to reducing institutional-level inequalities. |
| (Yeager et al., 2016) (Study 3)<br><br>*Teaching a Lay Theory Before College Narrows Achievements Gaps at Scale* | N = 1592<br><br>Incoming students at a highly selective private university.<br><br>USA | Social belonging.<br><br>Field experiment with random assignment to a social-belonging intervention, a cultural-fit intervention, a critical-feedback intervention or an active control condition.<br><br>Web-based, consisting of intervention content and a writing task (a "saying-is-believing" exercise), 1 x 25 min.<br><br>Administered online for students to complete in their own time. | None. | Approx. 10 months:<br>First year GPA<br><br>Approx. 11 months follow-up survey:<br>Social and academic integration | The three interventions were equally effective as they increased first year GPA among disadvantaged students (OR = 1.6), but not among advantaged students. In addition, compared with controls, treated disadvantaged students reported greater social and academic integration (OR = 3.7) i.e. having made more close friends, being more likely to have developed a close mentor relationship, being more involved in extracurricular groups and making greater use of academic support services. | The interventions reduced the achievement gap between advantaged and disadvantaged students by 31%.<br><br>Limitations: Highly selective sample. Only 31% of the sample provided data on social and academic integration. |

**Note**. OR = Odds Ratio.; Treated students = students in the treatment condition, i.e. in the intervention/-s tested; GPA = Grade Point Average; pSTEM = physical Science Technology Engineering Math. When effect size estimates were presented as Cohen's *d* in the articles, we transformed them to OR:s for the present overview. When a large amount of outcomes and effect size estimates were available, only the main results are presented here.

**Table 2.** Description of the 7 empirical studies on other interventions examining effects on social belonging.

| **Author**<br>**Year**<br>**Title** | **Study participants**<br>**Country** | **Main focus of intervention**<br>**Study design**<br>**Content of intervention**<br>**Administration** | **Mediation** | **Outcome** | **Results** | **Notes**<br>**&**<br>**Limitations** |
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| (Cook et al., 2012)(Study 1)<br><br>*Chronic threat and contingent belonging: Protective benefits of values affirmation on identity development* | N = 361 students in three waves from the beginning of 7th grade to the end of 8th grade<br><br>USA | Values affirmation.<br><br>Longitudinal field experiment with random assignment to intervention or active control group. Variations of the intervention were presented 3 to 5 times during the 7th grade and half of the students in the intervention group received additional interventions during the 8th grade.<br><br>Intervention was presented in a regular class and took 15 min. to complete. Students were presented with a list of | Academic performance (GPA of core courses: science, social studies, math and English/language arts) | Up to 2 years: Academic belonging (including the two components social belonging and potential to succeed in school) was assessed at the beginning and end of each academic year except for the first wave of students, who for practical reasons were not assessed at the beginning of eighth grade. | Black students in the intervention group maintained their sense of belonging across 7th and 8th grade, while sense of belonging decreased for Black students in the control group. Sense of belonging also fluctuated less for students in the intervention group (i.e. it was more stable during the two years) and it became less contingent on academic performance. The effects were independent of improvement in grades. | The same intervention study has been previously described in Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, (2009) with a focus on effects on academic performance. The intervention reduced the achievement gap between Black and White students, as Black students in the intervention group performed at a higher level than controls during the 2 years. Low-achieving Black students benefitted the most from the |

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| | | values (i.e. athletic ability, creativity, religion) and asked to rate how important the values were to them. A writing exercise followed where they were to describe the top rated values.<br><br>Administered by teachers. | | | | intervention.<br><br>Limitations: Number of interventions varied between cohorts (3-5 during the 7th grade), which means no conclusion can be drawn regarding the extent of intervention sessions needed for positive outcomes to occur. However, correlational analysis suggested that receiving more than three interventions did not increase benefits. Also, there was no difference in sense of belonging between students who received interventions in 7th grade only and students who received additional booster interventions in 8th grade. |
| (Cook et al., 2012)(Study 2) | N = 121 7th graders | Values affirmation. | Academic performance (GPA | A couple of months: | The early affirmation condition was more | Limitations: No control group. |

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| *Chronic threat and contingent belonging: Protective benefits of values affirmation on identity development* | USA | Longitudinal field study. Participants were randomly assigned to two intervention groups. The two groups received the same intervention either early in the first semester of 7th grade (early affirmation condition) or approx. four weeks later (standard affirmation condition).<br><br>Interventions were presented in a regular class and took 15 min. to complete. Students were presented with a list of values (i.e. athletic ability, creativity, religion) and asked to rate how important the values were to them. A writing exercise followed where they were to describe the top rated values.<br><br>Administered by teachers. | of core courses: science, social studies, math and English/language arts) | GPA in core courses: science, social studies, math and English/language arts at end of the first quarter of 7th grade<br><br>Approx. 18 weeks: Academic belonging (including the two components social belonging and potential to succeed in school) | effective than the standard affirmation condition for previously low-performing Black students' sense of academic belonging. No differences between the intervention conditions were seen between high-performing Black students. For White students, the opposite pattern emerged: Low-performing students benefitted more from the standard intervention. Further, students in the early condition had higher grades than students in the standard condition. The effects were independent of improvement in grades. | |
| (Gehlbach et al., 2016) | N = 315 ninth grade students + 25 teachers | Perceived similarities in the teacher-student | None. | Approx. 1 week: Mid-quarter grades | There was no effect of the intervention on | This study does not explicitly focus on |

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| *Creating birds of similar feathers: Leveraging similarity to improve teacher-student relationships and academic achievement* | at a large, suburban high school<br><br>USA | relationship.<br><br>Field experiment with random assignment of both students and teachers to intervention or control groups. Students received sheets listing five things they had in common with their teacher. Teachers received feedback sheets with five things they had in common with each student. A series of brief questions followed as to deepen the perception of information. 1x15 min.<br><br>Administered by researchers. | | Survey after approx: 1 month:<br>Perception of similarity, perception of student-teacher relationships, teacher-reported interactions with students<br><br>Approx. 6 weeks: Final-quarter grades<br><br>Approx. 16 weeks: End-of-semester grades, attendance, tardiness. | White or Asian students. For the remaining "underserved" (primary Black and Latino) students, the intervention enhanced teachers' and students' perceptions of similarity but it had no clear effect on perceived student-teacher relationship or grades. Treated teachers reported having interacted more with underserved students. There was no effect on student class attendance or tardiness. | social belonging.<br><br>Limitations: The analysis lacked desired statistical power, which means that the results must be cautiously interpreted. |

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| (Rosenthal et al., 2013)<br><br>*In pursuit of the MD: The impact of role models, identity compatibility, and belonging among undergraduate women* | N = 55<br><br>Women. Undergraduates at a public university interested in being pre-med.<br><br>USA | Role models.<br><br>An experimental online study with random assignment to intervention or passive control group. In an online intervention, participants were exposed to brief biographical descriptions of successful female physician role models. As a cover story, they were told to evaluate the content and journalistic style of the articles.<br><br>Administered by researchers. | Perceived identity compatibility. | Survey immediately after the intervention: Sense of belonging, perceived identity compatibility, interest at being pre-med. | The intervention resulted in greater perceived identity compatibility, sense of belonging, interest in being pre-med, and interest in pursuing a career as a physician compared with the control condition. Perceived identity compatibility mediated the relationship between exposure to role models and sense of belonging in pre-med. | Limitations: Women only and small sample size. No active control group. Outcomes were assessed directly after the intervention, which means that we don't know if the effects of the intervention last even for a short time. |
| (Sherman et al., 2013) (Study 2)<br><br>*Deflecting the Trajectory and Changing the Narrative: How Self-Affirmation Affects Academic Performance and Motivation Under* | N = 151<br><br>Latino American and White 7th graders<br><br>USA | Values affirmation.<br><br>Field experiment with random assignment to intervention or active control group. 2x15 min. Same procedure as in Cook et al. 2012.<br><br>Administered by teachers. | | Multiple assessments from 2 weeks to 9 months: Academic fit (including belonging in school, school self-efficacy, proudness in school), level of construal and daily adversities, identity threat. | Latino American students receiving the intervention got higher grades than controls (OR = 2.3). The racial achievement gap was reduced by 32% in the intervention groups, compared with controls. | Results suggest that the intervention made Latino American students construe daily adversities as isolated events, not as signs of threat to their identity or that they did not fit in.<br>In Study 1 in the same article, a values- |

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| *Identity Threat* | | | | Up to 9 months: GPA of each quarter during the school (= 4 assessments) | The intervention increased Latino American students' level of construal (OR = 3.3) and their sense of academic fit as well as perceived identity threat became independent of their day-to-day adversities (OR = 5.2 for academic fit and OR = 5.1 for identity threat).<br><br>For all students, Latino and White, the intervention only decreased perceived daily adversities (OR = 1.9). | affirmation intervention increased Latino American adolescence grades. Effects were seen even after 3 years.<br><br>For Latino American students in the control group, their day-to-day adversities correlated with sense of academic fit and identity threat, respectively.<br><br>Limitations: It is unknown if the intervention increased academic fit (and thereby school belonging). The results suggested that students changed their perspectives and that this may have had a positive impact on their grades, but mediation analysis was non-significant. Either the power was too low or |

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| | | | | | | the increase in academic performance was due to other factors than change in identity threat and academic fit. |
| (Shin et al., 2016)<br><br>*Effects of role model exposure on stem and non-stem student engagement* | N = 1035<br><br>Students at a racially/ethnically diverse state university. Approx. 30% in STEM-disciplines (e.g. biology, engineering, computer science, mathematics) and 70% in other disciplines.<br><br>USA | Role models.<br><br>An experimental online study with random assignment to intervention group or passive control group. Same content as described above, but with role models being more diverse as to challenge stereotypes not only about gender in STEM-disciplines, for example, the role models had different ethnical backgrounds and were both men and women. They also emphasized the role of effort to succeed with the studies.<br><br>Administered by researchers. | None. | Survey immediately after the intervention: Academic belonging, gender sense of belonging, STEM-interest, perceived identity compatibility, academic self-efficacy, academic expectations, and variety of other measures mainly relating to gender. | Students exposed to role models reported higher interest in STEM and greater perceived identity compatibility between self and STEM than controls. They also reported greater sense of belonging in the academic environment (i.e. sense of belonging in their major, department, and school), academic self-efficacy, and perceived fit between being a woman and being in STEM. The intervention had no effect on academic expectations. | Note: The main focus of this intervention was to increase STEM recruitment and retention. Belonging was not a main focus, but one of many other outcomes.<br><br>Limitations: No active control group. Outcomes were assessed directly after the intervention. |

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| (Stephens et al., 2014)<br><br>*Closing the social-class achievement gap: A difference-education intervention improves first-generation students' academic performance and all students' college transition* | N = 168<br><br>66 first-generation students (who did not have parents with 4-year degrees) and 81 continuing-generation students (who had at least one parent with a 4-year degree)<br><br>Incoming students at a private university.<br><br>USA | Difference-education.<br><br>Experimental field study with random assignment to an intervention or active control group. In addition, they used a passive control group consisting of the rest of all first-year students (N = 1784) when analyzing differences in GPA.<br><br>One hour panel session. Senior students with diverse social-class backgrounds shared their stories of how different backgrounds can affect the college experience both positively and negatively and that students need to use different strategies for success. After the panel participants completed a video testimonial – a saying-is-believing task. | Tendency to seek out college resources (e.g., how often students e-mailed or met with professors or sought extra help). | Approx. 9 months: End-of-year GPA<br><br>End-of-year survey: Stress and anxiety, psychological adjustment (i.e. psychological well-being and social fit), academic engagement (including academic identification), social engagement (including maintained relationship). | The intervention increased first-generation students' GPA (OR = 3.6), mediated by a higher tendency to seek out college resources. The intervention reduced the achievement gap between first- and continuing-generation students with 63%.<br><br>All treated participants experienced higher well-being and social fit, academic identification, and more maintained relationships than active control. | Limitations:<br>Although, tendency to seek out college resources mediated increased GPA among first-generation students, and the gap in tendency to seek out college resources between first- and continuing-generation students was not significant among treated students, tendency to seek out college resources was not statistically higher among treated first-generation students than controls. |

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| | | Administered by researchers and a panel of senior students. | | | | |

**Note**. OR = Odds Ratio.; Treated students = students in the treatment condition, i.e. in the intervention/-s tested; GPA = Grade Point Average; pSTEM = physical Science Technology Engineering Math. When effect size estimates were presented as Cohen's *d* in the articles, we transformed them to OR:s for the present overview. When a large amount of outcomes and effect size estimates were available, only the main results are presented here.

## 5.2 Meta-analytic review

The second meta-analysis provided a summary of intervention studies in educational contexts that were grounded in different motivation theories (Lazowski & Hulleman, 2016). Of 158 evaluated papers (extracted from 1471 search results), 74 papers defined the data for analysis, including 92 effects based on 38,377 participants. Data comprised experimental or quasi-experimental studies (64 vs. 28 studies, respectively) performed in settings ranging from kindergarten up to post-secondary school. Interventions were based on different theoretical frameworks (including interventions based on the social-belongingness and values-affirmation frameworks). The ecological validity was high for most studies (i.e., a high degree of naturalness) as interventions were performed in everyday school settings using dependent variables (mostly students' achievement) that normally occurred within that setting. The results indicated that the motivation interventions were generally effective. The pooled effect size was 0.49 (Cohen's d) corresponding to an odds ratio of approximately 2.2 (odds ratios transformed and calculated from paper). Thus, children participating in a motivation intervention were found to be 2.2 times better off in achievement than those not part of the intervention. The effect size was rather stable across ages, with the highest effects among $6^{th}$ to $8^{th}$ graders (odds ratio 2.8) and lowest among $9^{th}$ to $12^{th}$ graders (odds ratio 2.1). Of the 74 analyzed papers, five studies reported results from social-belonging interventions and eight studies reported results from values-affirmation interventions. The average effect on students' motivation and engagement across these studies was 0.35 for social-belonging interventions (Cohen's *d*) and 0.38 for values-affirmation interventions. These effects correspond to odds ratios of approximately 1.89 and 1.99 respectively (Lazowski & Hulleman, 2016).

# 6 Discussion

Social belonging has been identified as a crucial factor for student motivation and achievement. In particular, students in stereotyped or underrepresented social groups tend to be more vigilant for cues in the environment that may signal that they do or do not belong in educational settings. These concerns regarding belonging uncertainty may undermine academic engagement and performance and have been suggested to contribute to achievement gaps between students in different social groups. In the present report, we present findings from a literature search aimed at mapping and summarizing scientific papers published on the effects of social-belonging interventions in educational settings. In addition, we present findings from studies on social-psychological interventions which were not explicitly designed to target social belonging, but which were nevertheless found to have bolstered student belongingness. In total, seven empirical studies on social-belonging interventions (Table 1) and seven studies on other interventions that examined effects on students' sense of belonging were found (Table 2). In addition, in this report we summarize and discuss findings on social belonging and values-affirmation interventions in the meta-analysis by Lazowski and Hulleman (2016).

Overall, the present findings show that brief social-psychological interventions in educational settings can increase students' sense of social belonging, and by mitigating doubts regarding belonging uncertainty, well-designed interventions can improve student motivation, academic achievement, well-being, and health. In addition to social-belonging interventions, several other interventions were found to have effects on student belongingness along with other motivational and achievement outcomes. This implies evidence that there are different psychological processes that can be targeted to affect students' sense of belonging, as well as academic persistence and performance. In particular, the interventions summarized in the present report enhanced outcomes among students of negatively stereotyped or underrepresented social groups, leading to decreased achievement gaps and thereby to enhanced equality in educational settings.

The present findings suggest that interventions which mitigate belonging uncertainty help to lever the stress of social identity threat among students facing negative stereotypes of their social group in educational settings. By changing certain common beliefs, also called lay theories, when transitioning to a new school, brief, well-designed interventions can affect recursive processes that unfold over time and thereby impact long-term academic outcomes (Cohen & Garcia, 2008; Walton & Cohen, 2007). In the present review, six studies by Walton and colleagues evaluated a social-belonging intervention that used attributional retraining, a message aiming at changing students' attribution of social adversities (Walton & Cohen, 2007, 2011; Walton et al., 2015; Yeager et al., 2016). In these studies, students learned that experiencing social adversities and belonging uncertainty – worrying about whether you fit in or not – is common and that these worries will lessen with time. Among students belonging to negatively stereotyped or underrepresented groups (i.e., Black students, socially and

economically disadvantaged students, and women in male-dominated settings), these interventions had significant positive effects on sense of belonging (e.g., lower sense of belonging uncertainty, greater perceived social fit, greater social integration), and outcomes regarding motivation (e.g., studying and contacting professors more, experiencing less self-doubt, and feeling more confidence in one's ability to succeed), achievement (e.g., higher grades and increased college enrollment), and health (e.g., better self-rated health, fewer visits to the doctor, and higher level of happiness).

On the contrary, the effects of the social-belonging intervention tested by Hausmann and colleagues (2009) were less clear: Sense of belonging increased among White students but not Black students both in the social belonging and active control condition and even though some aspects of receiving e-mails and small gifts did increase sense of belonging among White students, it had no effect on academic outcomes. Thus, this intervention differed substantially, both in content and effect, from the interventions by Walton and colleagues.

Aside from the intervention by Hausmann and colleagues, the social-belonging interventions typically did not affect majority students' sense of belonging or academic outcomes. However, in the study by Walton and Cohen (2007), White students who had received the intervention reported lower sense of academic fit (including social fit, self-efficacy, academic identification, enjoyment of academic work, and potential to succeed in college) than White students in the control group. They also earned lower grades compared with students in the control group, but not lower than the campus-wide average for White students. Negative effect on majority students' – or on students who were members of positively stereotyped groups – has been reported in other intervention studies as well (Miyake et al., 2010). We will look further into this issue when discussing the findings on values-affirmation interventions.

The social-belonging interventions by Walton and colleagues can be seen as consisting of three key components. These components may contribute to the effects of the intervention due to their impact on different sub-processes: (1) The simple message that 'others feel like you do' can change the interpretation of adversities from being cues which signal that 'people like me don't belong here' to being just a part of the normal college experience. Similarly, previous attributional-retraining interventions targeting academic difficulties (not focusing on social aspects) have been seen to increase students' grades and standardized test performance (Good, Aronson, & Inzlicht, 2003; Wilson, Damiani, & Shelton, 2002; Wilson & Linville, 1985). (2) The message that it will get easier with time – a kind of a growth-mindset message as it implies that the current situation and experiences are neither stable nor unchangeable – can affect how students react in the face of challenges. For example, studies have shown that promoting a growth mindset of social relations (the belief that social relations are malleable and can change with time) as opposed to a fixed mindset of social relations (the belief that they cannot change much, no matter what you do) enhances students' well-being and affects their behavior when encountering social

setbacks. (For a review of mindset interventions in academic settings, see Miller et al., 2016). (3) The saying-is-believing exercise (where students are asked to help new incoming students to understand the transition to college by summarizing the survey results and the relevance of the stories to their own experiences) can help students internalize the messages and make them "helpers" instead of "in need of help". This has been described as an important factor for the effectiveness of the intervention, as the situations of adults trying to help students may create student reactance that hinders change. Moreover, the technique has been described as powerful and pervasive as it promotes deep processing and encourages students to commit themselves to the messages conveyed in the intervention, as well as to relate the content to their own lives and experiences (Aronson, 1999; Yeager & Walton, 2011).

All social-belonging interventions were conducted in the U.S. between 2007 and 2016. This displays that intervening on social belonging in order to enhance motivation and achievement in students is a relatively new line of research, which is yet to be explored in other cultural contexts outside of the U.S. Further, they were all performed on students transitioning to higher education, which means that students received the intervention before or during their first year of college or university. These findings imply that there is evidence that the interventions a) are effective when students are meeting the challenges of entering a new educational setting, and b) have not yet been evaluated on younger students. Firstly, worries about fitting in tend to arise especially when people are new in a social context. Transitioning to college or university can be an overwhelming time, especially for low-income, first-generation, and underrepresented students who typically have fewer resources to help them navigate and more often experience social identity threat. During this transition, it has been proposed that experiences early on may be more important for student engagement and persistence than later ones. Therefore, it is unknown if a social-belonging intervention would have the same effects if performed later on in higher education. Secondly, the present findings lack research on social-belonging interventions on students of younger age. However, at the present time, several social-belonging intervention studies are ongoing[4]. In one as yet unpublished study (Goyer et al., 2016, as cited in (Okonofua, Walton, & Eberhardt, 2016b), a social-belonging intervention was given to sixth-graders to enhance students' sense of belonging and relationships with teachers during the transition to middle school. This intervention has been described as reducing disciplinary incidents among Black boys over the next seven years, from Grade 6 through Grade 12. The disciplinary incidents were reduced by 64 percent as compared with Black boys who did not receive the intervention. Additionally, by the end of seventh grade, the intervention also forestalled a drop in Black boys' sense of belonging and an increase in worrying about being seen stereotypically. This study highlights that worrying about belonging uncertainty may have long-term

[4] For example, The College Transition Collaborative is conducting research to understand the effectiveness of social-belonging interventions on students from different social backgrounds in varied academic settings. For more information, see http://collegetransitioncollaborative.org/

detrimental effects on students long before leaving high school and that a brief psychological intervention may help change students' trajectories – not only in regard to motivation and achievement but also in regard to classroom behavior and social relations.

Aside from social-belonging interventions, the present search resulted in finding other kinds of interventions that affected students' sense of belonging as well. The interventions on values affirmation (Cook et al., 2012; Sherman et al., 2013), role models (Rosenthal et al., 2013; Shin et al., 2016), and difference-education (Stephens et al., 2014), in different ways all aimed at reducing social identity threat among negatively stereotyped or underrepresented groups. They also enhanced outcomes on belongingness along with outcomes on motivation and achievement. However, on the contrary, the intervention by Gehlbach et al. (2016), aiming at promoting teacher-student relationships (and thereby students' grades) by increasing perceived similarity, was based on research showing that similarity increases liking (Montoya, Horton, & Kirchner, 2008; Myers, 2015). This intervention did indeed increase perceived similarities among students as well as teachers, but the lack of significant effects on perceived relationships and grades implies that this intervention needs to be further developed and evaluated.

Regarding values-affirmation interventions, there are several studies on their effects on academic achievement which are not included in the present review since they did not evaluate effects on belongingness (for reviews, see Cohen & Sherman, 2014 and Sherman, 2013). For example, values-affirmation interventions have been seen to reduce the gender achievement gap in college science (Miyake et al., 2010), the achievement gap between first-generation college students and continuing-generation students in an introductory biology course (Harackiewicz et al., 2014), and the racial achievement gap in middle school students (Cohen, Garcia, Apfel, & Master, 2006; Cohen et al., 2009; Sherman et al., 2013). Interestingly, an analysis of the content of the participant-generated affirmation essays in Cohen et al. (2006; 2009) revealed that writing about social belonging in particular reduced identity threat among negatively stereotyped students (Shnabel, Purdie-Vaughns, Cook, Garcia, & Cohen, 2013). More precisely, they found that writing about social belonging mediated the effect of the values-affirmation intervention on Black students' academic performance. Written material on social belonging was described as writing about how an important value "makes one feel closer to and more connected with other people or promotes the experience of having and enjoying positive social bonds" (Shnabel et al., 2013 (p. 664)). To illustrate, they used the following example, which was written by a Black seventh-grade student: "My friends and family are most important to me when I have a difficult situation that needs to be talked about. My friends give me companionship and courage. My family gives me love and understanding". However, unexpectedly, for White students, writing about social belonging was related to poorer performance (i.e. lower grades). A negative trend in the effects of a values-affirmation intervention for some groups has also been seen in other studies. For instance, in Miyake et al

(2010), the intervention that benefitted women in science class had a negative effect on men's performance. At least three speculative explanations for negative effects on outcomes among majority students have been suggested: Firstly, the interventions may have altered some students' belief in their group's superiority, reducing the enhancing effect of stereotype lift (Walton & Cohen, 2003). Secondly, assuring people that they belong when they don't have concerns regarding belonging may instead communicate a message that they should be worrying about belonging or that they are in need of assurance of their belonging (Walton & Cohen, 2007). Thirdly, focusing on belonging may reduce stress. In students in stigmatized groups who may have a heightened stress level due to social identity threat, stress reduction may result in positive outcomes. However, for optimal performance a certain amount of stress is needed. Among non-stigmatized students, stress reduction may lead to too low levels of stress for optimal performance. Considering these possible negative effects on majority students, it is important that interventions in educational settings are thoroughly tested and evaluated.

That a values affirmation can have an impact on student motivation and achievement by bolstering belongingness among underrepresented students is additionally suggested by the study of Walton et al. (2015). In this study, a social belonging intervention and a values-affirmation intervention were tested and evaluated in comparison to each other and an active control group. Both interventions were equally effective in their improvement of grades and self-confidence among women in male-dominated majors as compared with the control condition. In addition, the interventions increased friendships, but of different kinds. Among women in male-dominated majors, the social-belonging intervention resulted in more friendships with male engineers and the values affirmation in more friendships with female non-engineers. It is possible that more friendships of both kinds positively affected motivation and achievement.

The findings that interventions targeting different psychological mechanisms can help enhance students' sense of belonging is in line with previous research on social identity threat and how concerns of belonging uncertainty may be evoked, or alleviated, by different situational cues and different stereotypes (Cohen & Garcia, 2008; Inzlicht & Schmader, 2012)[5]. In the present review, two studies compared the effects of receiving a social-belonging intervention with a) a growth-mindset intervention, b) a social-belonging intervention, and c) a combination of both (Yeager et al., 2016 [Study 1 and 2]). All three conditions were compared with active control interventions. In Study 1, conducted on racial minority or first-generation students from high performing charter schools, the social-belonging intervention enhanced social and academic integration and college enrollment while no effects were seen from the growth-mindset

[5] An illustrative example of sources of women's lower sense of belonging in pSTEM fields and potential solutions is provided by Mindset Scholars Network, see http://mindsetscholarsnetwork.org/wp-content/uploads/2015/09/Reduce-Gender-Gaps-in-pSTEM.pdf

intervention. On the contrary, in Study 2, conducted on a large number of incoming students at a high-quality public university, the social-belonging intervention, growth-mindset intervention, and the combination of both, were all equally effective. They all enhanced academic and social integration as well as college enrollment among socially and economically disadvantaged students. The diverging results were suggested to be an effect of a) the different student populations or b) differences in the presentation of the growth mindset message. That the growth-mindset intervention was ineffective in Study 1 could be because most students (81%) in the high-performing charter schools already endorsed a growth mindset before the intervention. Thus, the intervention did not teach most students something new. Further, the presentation of a growth mindset as a private belief (tested in Study 1) may not be as effective as presenting it as a reflection of their new college's values (tested in Study 2). A previous study has shown that people's perception of what mindset an organization endorses can affect worries about ability. In particular, the perception of an organization's endorsement of a fixed mindset can lead people who face negative stereotypes to worry that their intelligence will be questioned (Murphy & Dweck, 2010). Perhaps, the perception of the new environments' mindset is of greater importance than individuals' private beliefs? The results from Yeager et al. (2016) highlight the importance of well-designed and well-planed interventions, as many factors may contribute to an intervention's effectiveness.

Furthermore, the results of Study 2 and 3 in Yeager et al. (2016) provide evidence that to enhance greater equity in student outcomes, in certain contexts, a social-belonging intervention is just as effective as a growth mindset intervention, a critical-feedback intervention focusing on enhancing trust[6] (Yeager et al., 2014), and a cultural-fit intervention. These four interventions all address lay theories that can influence students' sense of belonging. They are all suggested to affect motivational and achievement outcomes through similar recursive processes: the lay theories affect interpretations of adversities which affect sense of belonging which in turn influences engagement and thereby performance. In this way, teaching a lay theory of who one needs to be to succeed in college may help break a "cycle of mistrust" (Yeager et al., 2014).

Regarding the recipients of the interventions, all interventions in the present literature overview addressed students, with the exception of the intervention targeting perceived similarities which was performed on both students and their teachers (Gehlbach et al., 2016). Another approach is to intervene on teacher's lay theories that may influence their perception and behavior in the classroom, in turn affecting student outcomes. In one promising study of Okonofua, Paunesku, and Walton (2016a), an intervention encouraging teachers to adopt an empathic rather than punitive mindset about discipline – to value students' perspectives and sustain positive relationships while encouraging better behavior – halved year-long suspension rates. It further

[6] Concerns about trust is also commonly evoked by social identity threat (Inzlicht & Schmader, 2012).

resulted in the most at-risk students (i.e., previously suspended students) feeling more respected by their teachers and it thereby enhanced the quality of the teacher-student relationship. (For a social-psychological perspective on racial disparities in school discipline, see Okonofua et al., 2016b). More research is needed on how teacher's beliefs and classroom behavior may foster students' sense of belonging.

On the basis of the present review, no conclusions can be drawn regarding which intervention is the most effective. The literature search was performed with the aim of creating an overview of studies on social-belonging interventions specifically. The studies on other kinds of interventions that enhance student belongingness should only be seen as examples of how student belongingness can be enhanced in alternative ways. This means that there are most likely additional studies on other kinds of interventions that may affect students' belongingness that are not included in this report. Further, to be able to compare effectiveness, quantitative analyses are necessary, which are beyond the scope of the current review. In the meta-analysis of Lazowski and Hulleman (2016), such quantitative analyses are conducted, but the effects on social belonging are not evaluated separately, instead, the effect sizes represent a wide range of outcomes. In addition, only four studies (three articles) on social-belonging interventions are included (Gehlbach et al., 2016; Hausmann et al., 2009; Walton & Cohen, 2007), of which one study is a laboratory experiment only and not an intervention study (Walton & Cohen, 2007 [Study 1]). One could also ask about the meaningfulness of an estimated effect size for the outcomes of these three very different interventions. Apart from quantitative analysis to compare the effectiveness of interventions with different content, the context in which each intervention is performed must be taken into consideration. The effectiveness of an intervention is highly dependent on its context, and on what specific challenges students experience in the current setting[7].

What are the implications of the present findings for Swedish students? To improve schools in Sweden, suggestions have been made to prioritize "establishing the conditions that promote quality with equity across Swedish schools" (OECD, 2015, p. 3). In Sweden, achievement gaps by social groups exist as well, but many factors differ between the American and Swedish society and educational systems. This may influence what kind of challenges students from varied social groups face and how they contribute to inequity. As stressed above, it is crucial to examine the specific worries and psychological barriers which students struggle with in each specific context and to create "wise interventions" that affect processes which unfold over time and impact long-term consequences (Kenthirarajah & Walton, 2015; Walton, 2014; Yeager & Walton, 2011). If we are to create educational settings that support students from diverse backgrounds, we also need to examine how the local environment may, even unintentionally, signal identity threat.

[7] This has been discussed for example by Dr. Gregory Walton at a webinar available at https://vimeo.com/87897118

We need to use multiple solutions to enhance inclusion and belongingness in educational settings.[8] Changing students' lay theories is not effective if other necessary factors, such as competent teachers, are not present. For instance, an intervention on attributional retraining had no effect on students when accompanied by poor instructions, but when paired with high-quality instructions, academic performance increased (Menec, Perry, Struthers, Schonwetter, Hecter, & Eichholz, 1994, as cited in Inzlicht & Schmader, 2012).

For the future development of belonging interventions, Walton and colleagues have summarized a few guidelines for "getting the message right"[9]. These guidelines include recommendations of conducting interviews and focus groups before performing an intervention. They also stress the importance of how the messages in the students' stories are depicted, based on their current experiences of conducting interventions studies. These recommendations should be taken into consideration when planning an adaptation of the social belonging intervention to new educational contexts. In addition, valid and reliable measures are needed to enable proper evaluation of intervention effects on student belongingness in other contexts (e.g., in other languages). Furthermore, the design of study surveys and order of questions may impact students' answers regarding their belongingness (Mallet et al., 2011).

It should be mentioned that while this review emphasizes social-psychological interventions to enhance students' sense of belonging, there are many other approaches described in the literature as well. For example, there is a variety of school and university programs that are seen to have an enhancing effect on students' sense of belonging. These programs encompass components such as mentoring, formal learning communities, orientation, and peer tutoring, Some target sense of belonging directly (Cohen, Chang, Pooley, & Pike, 2008; Countryman & Zinck, 2013; Kronholm, 1987), while others have not specifically focused on sense of belonging but have evaluated it as an outcome measure along with several other outcomes (Buchwitz et al., 2012; Fougner, 2013; Holt, Bry, & Johnson, 2008; Humphrey & Ainscow, 2006). Other approaches include focusing on promoting teachers' attitudes and practices in the classroom which may promote student belongingness (Turner, Warzon, & Christensen, 2011) and to manipulate pedagogical methods and examine their effect on belonging (Barbieri & Booth, 2016). Further, online communities or social networking have been suggested as means to enhance students' sense of

[8] An up-to-date article based on empirical research on how to promote inclusion and reduce social identity threat to support college success can be found on the website of The Century Foundation, see https://tcf.org/content/report/promoting-inclusion-identity-safety-support-college-success/?utm_content=bufferfc3e1&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer

[9] The guidelines are presented at the webpage http://scitation.aip.org/upload/PhysicsToday/print_edition_files/vol-67_iss_5_p43_1/PT.3.2383.Supplement.pdf

belonging (Tomai et al., 2010). For example, in a survey study on first year university students, the use of a Facebook account established by the university was seen as contributing to the opportunity to engage with peers and the education community and to a positive university experience (McGuckin & Sealey, 2013). This shows that there are many possible methods to consider when aiming to increase students' sense of belonging in educational settings. However, brief social-psychological interventions in education have been described as beneficial as with only relatively scarce resources they can be designed to reach many students and provide long-term effects (Walton, 2014; Yeager & Walton, 2011).

## 6.1 Conclusion

To conclude, the present findings suggest that social-belonging interventions in educational settings may be an effective motivational tool to enhance student motivation and academic achievement, as well as well-being and health among students of negatively stereotyped or underrepresented social groups. However, these interventions need to be further researched to examine if they are effective in non-American populations, on younger students, and in other educational contexts. In addition, sense of belonging can be improved by values affirmation, role model, difference-education, growth mindset, critical feedback, and cultural-fit interventions, in addition to other academic outcomes. In summary, this provides evidence that brief social-psychological interventions in educational settings can help reduce academic achievement gaps between students of different social groups, and thereby contribute to greater equality in education.

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## *7.1 Dissertations of interest*

Ahlqvist S (2015): Reducing the gender gap in science, technology, engineering, and math fields: Developmental and experimental extensions of the perceived identity compatibility model. *Dissertation Abstracts International: Section B: The Sciences and Engineering* **75**, No-Specified.

Heinze JE (2013): Belonging and social transitions: The role of belonging needs during a period of social transition. *Dissertation Abstracts International Section A: Humanities and Social Sciences* **74**, No-Specified.

Jordan KL (2015): Intervention to improve engineering self-efficacy and sense of belonging of first-year engineering students. *Dissertation Abstracts International Section A: Humanities and Social Sciences* **76**, No-Specified.

Ricard N (2014). Effects of social exclusion and inclusion on basic needs satisfaction, self-determined motivation, the orientations of interpersonal relationships, and behavioural self-regulation. *Dissertation Abstracts International: Section B: The Sciences and Engineering* **74**, No-Specified.

Urciuoli RJ (2007): Getting hooked on school: Modifiable factors contributing to the sense of school belonging among middle school students. *Dissertation Abstracts International Section A: Humanities and Social Sciences* **68**, 2327.

## 7.2 Recommended links

http://mindsetscholarsnetwork.org/learning-mindsets/belonging/

http://mindsetscholarsnetwork.org/wp-content/uploads/2015/09/What-We-Know-About-Belonging.pdf

https://tcf.org/content/report/promoting-inclusion-identity-safety-support-college-success/?utm_content=bufferfc3e1&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer

http://gregorywalton-stanford.weebly.com/uploads/4/9/4/4/49448111/getting_the_belonging_message_right.pdf

http://www.reducingstereotypethreat.org/

https://www.mindsetkit.org/belonging