MASTER THESIS

Feeling at home in the STEM sector: A diary study on how conversational acceptance and achievement affects STEM newcomers' self-efficacy beliefs

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Feeling at home in the STEM sector: A diary study on how conversational acceptance and achievement affects STEM newcomers' self-efficacy beliefs

A master thesis on how conversational acceptance and conversational achievement, evoked through cues in workplace interactions, influence the self-efficacy beliefs of newcomers in STEM, providing insights for the retainment of STEM professionals in the work field.

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Abstract

The Dutch science, technology, engineering, and mathematics (STEM) sector deals with a growing shortage of STEM professionals. The first period in a new job at a new organisation is crucial for the retention of STEM professionals, as a large number of newcomers decide to stay or leave within six months. A possible explanation causing non-prototypical newcomers not feeling at home, is the stereotypical perception of the ideal STEM professional (shy, intelligent, male) within STEM. Studies suggest that pleasant workplace interactions holding cues that evoke conversational acceptance and conversational competence are particularly crucial for the well-being of newcomers. Moreover, literature showed that newcomers who experience confidence regarding their own ability to perform in a career (i.e., self-efficacy beliefs), are more likely to stay in the STEM field. Therefore, the current study aimed to examine the daily effects of acceptance and achievement, evoked by daily workplace interactions, on the daily level of self-efficacy among STEM newcomers. In addition, the moderating effects of self-prototypicality (i.e., newcomers perceiving themselves as (non-)prototypical STEM professionals) were investigated. This involved establishing a daily diary study to collect data in the natural work setting and at the daily level to explain what effects occurred at day- and person-level. Findings showed that on days when newcomers experience more conversational acceptance or conversational achievement, they experience more self-efficacy. At the person-level, newcomers who generally experience more acceptance after interactions were found to generally feel more confident about their required abilities. Regarding conversational achievement, effects were also found at the person-level such that, the more conversational achievement newcomers experience, the more self-efficacious they felt. However, no support was found for self-prototypicality as a moderator for the effect on the relationship between conversational acceptance/ conversational achievement and self-efficacy. Additional analysis showed on day-level that conversational achievement had a stronger effect on self-efficacy than conversational acceptance, when both conversational acceptance and conversational achievement were included. On person-level, the effects of conversational acceptance disappeared when conversational achievement was included. The present study highlighted the importance of employers being aware of factors that predict newcomers' self-efficacy, such as the feeling of acceptance and achievement evoked through cues in interactions. Ultimately, newcomers can more easily feel at home within the organisation, contributing to the retention of STEM professionals in the sector.

Key words: STEM newcomers, Self-efficacy, Conversational acceptance, Conversational achievement, Self-prototypicality

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Introduction

The technical sector in the Netherlands still encounters shortages of science, technology, engineering, and mathematics (STEM) professionals. Results of studies conducted by the UWV (Dutch Employees Insurance Administration Agency) show that the scarcity in many STEM professions will continue in the coming years (Reitsma & Wagenaar, 2020). To illustrate, 2017 started with 4.200 vacancies for STEM professionals with a higher or academic educational level. This number increased to 5.700 in the second quarter of 2020 (Reitsma & Wagenaar, 2020; Rijksoverheid & Platform Talent voor Techniek (PTvT), 2020). The increase of the demand for STEM professionals can be explained by technical professions being identified as crucial for sustaining economic and social functioning (Bakens, Fouarge, & Goedhart, 2020). Therefore, it is remarkable that STEM professionals opt to leave the technical sector, despite the fact that this sector is one of the sectors with the most outstanding vacancies (Reitsma & Wagenaar, 2020) and has one of the highest paying jobs (European Commission, 2020). Moreover, it appears that 33% of the newcomers in an organisation leave the organisation within 6 months (Becker & Bolink, 2018). The importance of the early period for newcomers in terms of continuing their careers within the same organisation is demonstrated when no fewer than 34% decided within one week whether they wanted to stay with the organisation (Becker & Bolink, 2018). More insight into why newcomers in the technical sector decide to stay or leave could provide invaluable knowledge for contributing to the retention of STEM professionals in the sector.

First indications show that mostly STEM professionals that are not prototypical, such as women (Hall, Schmader, Aday, & Croft 2019; Hall, Schmader, Aday, Inness, & Croft, 2018; Hunt, 2016) or people who are, for example, communicative and fashion-conscious (Endedijk, Van Veelen, & Möwes, 2017) are dropping out the workplace. One reason for this could be that these STEM professionals do not strongly identify with, and therefore have less confidence in themselves as a STEM professional (Endedijk et al., 2017). The current stereotypical image of a STEM professional can be described as a highly intelligent, shy, white male (Endedijk et al., 2017). In the Netherlands, almost four times as many men as women work in the STEM sector. Therefore, gender stereotyping in STEM is explicitly and implicitly present to a large extent. Professionals who do not correspond to the stereotypical image are described as non-prototypical, unlike prototypical professionals who do fit the stereotypical STEM ideal. When STEM professionals do not conform to this prototypical image, they are inclined to believe that others think they do not match the image of a STEM professional (Van Laar et al., 2019), which may affect their self-efficacy beliefs. The confidence individuals have in their own abilities and aptitudes to accomplish tasks and to show behaviours that are essential for successful performance. This impression that individuals hold is referred to self-efficacy beliefs (Bandura, 1977). When people believe in their own ability to perform in a career or profession, they are more likely to

stay in that profession or field (Cech, Rubineau, Silbey, & Seron, 2011; Rittmayer & Beier, 2009; Seymour, 1995; Van Veelen, Derks & Endedijk, 2019). We therefore suggest that high self-efficacy beliefs are important to focus on if we want to reduce STEM drop-out rates.

There are individual differences in people's self-efficacy beliefs, but this is not a stable trait, as it fluctuates in relation to stimulating experiences (Xanthopoulou, Baker, Heuven, Demerouti, & Schaufeli, 2008; Zeldin & Pajares, 2000). Previous research showed that if a person feels accepted, one's self-confidence regarding performing required tasks increased (Walton & Cohen, 2007; Zeldin & Pajares, 2000). The same has been shown for achievement, as this leads one to believe that one is sufficiently competent for the job (Hilts, Part, & Bernacki, 2018). Through interactions, one can get an indication of their performance (Hilts et al., 2018) and whether they are accepted (Rodriguez & Blaney, 2020) by gauging reactions and cues of others. Both these components (conversational acceptance and conversational achievement) are of particular relevance to self-efficacy, as these can boost someone's self-efficacy beliefs (Hilts et al., 2018; Rodriguez & Blaney, 2020; Walton & Cohen, 2007). Therefore, we argue that an important source for evoking daily fluctuations in self-efficacy levels are the interactions one has with colleagues in the workplace. When we understand how conversational acceptance and achievement can influence self-efficacy beliefs, this will provide actionable knowledge on how to retain a diverse group of professionals and make them feel at home in the STEM work field. Conversational acceptance and achievement might be especially beneficial for non-prototypical STEM professionals to increase their level of self-efficacy, as they might be less convinced of their inclusiveness.

To our knowledge, there is limited empirical work in naturalistic settings measuring daily fluctuations in job-related self-efficacy and the impact of workplace interactions between employees. Therefore, this research addresses this gap in literature by seeking to explore whether newcomers' daily workplace interactions, that evoke conversational acceptance and conversational achievement, have an effect on their daily levels of self-efficacy beliefs. Theoretical grounding was first developed in order to outline concepts and interrelationships, and to underpin expectations. After that, we performed a daily diary method among a sample of STEM professionals who are new to an organisation to study daily levels of self-efficacy in their natural environment.

Theoretical framework

The role of self-efficacy in the retention of engineers in the STEM field

When a person has confidence in his or her knowledge and ability to successfully perform in their work, he/she is more likely to persist in the STEM field (Buse, Bilimoria, & Perelli, 2013; Cech et al., 2011). An underlying explanatory theory for this is the Social Cognitive Career Theory (SCCT) Model of Lent, Brown, and Hackett (1994), a framework for explaining and predicting career

behaviour (Fouad, 2014). In this model, self-efficacy is an important component in the choice of actions to be taken regarding the career (Fouad, 2014). According to the model, a person's self-efficacy beliefs and outcome expectations are predictors of their career interests. Career interests are defined by Lent et al. (1994, p. 88) as ''patterns of likes, dislikes, and indifferences regarding career-relevant activities and occupations'' and ultimately contribute to the intention to continue or not with (career) activities (Fouad, 2014). Self-efficacy can be defined as the extent to which a person believes one has the ability to successfully execute a given task or behaviour (Bandura, 1977) regarding their career, such as decision making, development and making career choices (Anderson & Betz, 2001; Betz & Hackett, 1981; Nasta, 2007). Meaning, when one has higher levels of self-efficacy, it enables them to achieve work-related performance because they consider themselves capable to perform work behaviours that are required, or even more difficult (Bandura & Locke, 2003; Lent et al., 1994). Through the success achieved, confidence in oneself to be capable of accomplishing work grows, which is more important for self-efficacy beliefs than merely having the abilities to perform tasks successfully (Rittmayer & Beier, 2009; Seymour, 1995). Having confidence in abilities for work-achievement and positive results enhances increases enduring career interests in related professions and work fields (Lent et al., 1994). Moreover, Singh, et al. (2013) described that the sense of commitment someone feels to the organisation depends to a large extent on the perception that they can meet the expectations of the job (Block, Hall, Schmader, Inness, & Croft, 2018). This implies that it is important to have self-confidence in the own abilities in order to stay in an organisation as an employee (Rittmayer & Beier, 2009; Seymour, 1995). So, in context of the present research, when a STEM newcomer has confidence in their knowledge and ability to successfully perform in the job, he/she is more likely to continue to stay with the organisation and in the STEM field (Buse et al., 2013; Cech et al., 2011).

Self-efficacy beliefs can fluctuate over short periods of time because of performance experiences. A useful yardstick to get an impression of your own performance is in interactions with others. There are four sources of information that are key predictors of self-efficacy through events and experiences that take place on a daily level (e.g., interpretating task performances or receiving feedback from colleagues). The four sources of information are mastery experience, verbal persuasion, vicarious experiences (i.e., observing role models), and psychological and emotional states (i.e., a person's state of mind in situations where capabilities are challenged) (Bandura, 1997; Fouad, 2014). These sources contribute to self-efficacy beliefs through experiences that fluctuate on a daily level. Mastery experience fluctuates because previous performance outcomes and its interpretation determines whether one can muster what is required to accomplish tasks successfully (Bandura, 1997; Rittmayer & Beier, 2009; Zeldin & Pajares, 2000). In addition, verbal persuasions are fluctuating on a daily basis because others, such as parents or colleagues, provide feedback and judgements which positively impacts self-efficacy if these are of a positive nature (Zeldin & Pajares, 2000). The highest

impact on self-efficacy through verbal persuasion is provided by feedback that corresponds to actual job performances (i.e., mastery experience) (Rittmayer & Beier, 2009). Yet, verbal persuasions have a greater effect on self-efficacy when it comes to women in STEM (Zeldin & Pajares, 2000) because women in social environments such as engineering, where few similar colleagues are, derive considerable self-confidence from persuasions and feedback that confirms they fit in the STEM field (Hilts et al., 2018). It is therefore of major importance to understand how such social interactions can evoke conversational acceptance and achievement that may lead to higher levels of self-efficacy among STEM newcomers. Moreover, high levels of self-efficacy beliefs make an important contribution to retaining professionals in an organisation or work field. Therefore, the current study monitored self-efficacy on a daily level as an important predictor of retainment of STEM professionals.

Daily fluctuations of self-efficacy beliefs through workplace interactions

In their diary study on daily fluctuations in colleague support on job performance, Xanthopoulou et al. (2008) found that employees who experienced "an emotional type of colleague support" (p. 347) (e.g., respect, affective participation) showed a higher level of self-efficacy beliefs. They stated that employees gained confidence in their own resources for accomplishing tasks successfully because of collegial support. Not only clear signals (e.g., feedback) in conversations influence a person's confidence to perform tasks successfully. It appears that employees are critically evaluated in their interactions with colleagues and managers (Hall et al., 2015, 2019) through cues that indicate whether someone is accepted or is considered competent. For example, Robinson, McGee, Bentley, Houston, and Botchway (2016) used interviews to study a group of black people in STEM who are marginalized in this field because of their ethnicity. Participants indicated that mostly subtle cues in interactions with people of different ethnic backgrounds diminished their self-confidence, resulting in doubts in pursuing a career in STEM. Therefore, the daily interactions a newcomer has with colleagues may be of great importance for their self-efficacy beliefs. The current study further extends these earlier findings by investigating daily influences on self-efficacy through cues one receives and interprets in workplace interactions.

Conversational acceptance. Two components that are highly evoked by verbal persuasions of others, are conversational acceptance and conversational achievement (i.e., being sufficiently competent) (Bandura, 2006; Hilts et al., 2018). These components have been reported in multiple studies as influencers of self-efficacy, or a closely related concept (see Hilts et al. (2018) and Zeldin & Pajares (2000) for conversational achievement and Walton & Cohen (2007) for conversational acceptance). A feeling of being accepted is an important basic need for everyone (Walton & Cohen, 2007) and is mainly influenced through interactions with peers (Johnson, 2012; Rainey, Dancy, Mickelson, Stearns, & Moller, 2018). Conversational acceptance is substantive for those who are new

to a group, such as newcomers to an organisation attempting to become settled (Hilts et al., 2018). For marginalized groups, doubts about being accepted in social contexts are more likely to affect them negatively since they lack the prevailing stereotypical image (Walton & Cohen, 2007). In the STEM field, for example, women can be characterised as non-prototypical because mostly STEM professionals are men. This discrepancy can trigger a lack of acceptance for non-prototypical professionals. A combination of situational awareness and fear of marginalisation may lead to reduced performance due to a lack of focus on work activities as a result (Fisher, et al., 2019). Besides having consequences for performance and well-being, lack of acceptance perpetuates existing prejudices about non-prototypical employees (Rahn, Martiny, & Nikitin, 2021). When one cannot perform because conversational acceptance is absent, we believe that this may also affect self-efficacy beliefs. In fact, the actual performance increases the confidence that someone has the required capabilities (i.e., their self-efficacy beliefs) (Rittmayer & Beier, 2009; Seymour, 1995). Furthermore, in the study of Rodriguez and Blaney (2020), Latinas in STEM reported that their feelings of being accepted was negatively influenced by interactions that were "fraught with doubt, rejection, entitlement, and preferential treatment" (p.6) with peers and instructors. Moreover, persistence in STEM among Latina students was impaired by interactions with male peers, raising doubts about their abilities as a STEM professional and whether they were accepted in STEM (Rodriguez & Blaney, 2020), lowering their self-efficacy beliefs. Conversely, research has shown that among first-year black students, their confidence and belief in succeeding had risen notably as doubts about acceptance were dispelled by explaining that a majority of first-year students face doubts about whether they belong (Walton & Cohen, 2007). In addition, Holleran, Whitehead, Schmader, and Mehl (2011) found that when interactions were of a social nature instead of work-oriented, women felt more like they were accepted in the STEM faculty. Taking these findings into account, it can be argued that a conversational acceptance is of great importance to non-prototypical individuals in situations involving performance expectations and where there are few, if any, others whom they perceive as similar (Hilts et al., 2018; Niemiec & Ryan, 2009). Furthermore, we draw on reasoning from previous research in which conversational acceptance is derived from interactions that people have on a daily level. Thus, we expect that, depending on the nature of workplace interactions, newcomers' conversational acceptance to fluctuate on a daily level, influencing their self-efficacy beliefs.

> *Hypothesis 1: We expect that on days when STEM newcomers experience higher conversational acceptance, they experience a higher level of self-efficacy.*

Conversational achievement. A second component that influences self-efficacy beliefs is conversational achievement. Experiencing conversational achievement acknowledges having the needed competences for successfully accomplishing work-related activities (Bandura & Locke, 2003; Lent et al., 1994) and is perceived as a reason for belonging to the STEM work field (Rainey et al.,

2018). Conversational achievement therefore contributes to the formation of a person's self-efficacy beliefs because it aligns with mastery experience – a source of information that contributes to self-efficacy beliefs through the interpretation of past performance that demonstrates sufficient competence. Having positive experiences contributes to greater conversational achievement, which leads to a self-concept whereby one is perceived as competent enough to perform. Not only does past performance influence a person's conversational achievement, but interactions with peers and societal perceptions also seem to influence a person's self-perception of their competence in STEM (AAUW, 2013; Hilts et al., 2018). The STEM field is dominated by masculinity that is deemed the standard norm (Cabay, Bernstein, Rivers, & Fabert, 2018; Van Veelen et al., 2019), leading men to be considered more competent than women (Logel et al., 2009). For example, research indicated that when women interacted with men regarding work content, they were perceived as less competent than their male colleagues (Holleran et al., 2011). Conversely, interactions could enhance conversational achievement amongst minority groups in STEM. The study by Hilts et al. (2018) concluded that, especially for marginalized groups in STEM (women and underrepresented ethnicities), interactions and contact with peers stimulated their sense of being competent enough, which in turn predicted achievement and lowered intentions of leaving the STEM major. To conclude, when newcomers experience greater conversational achievement, this may enhance their self-efficacy beliefs because they are convinced to be competent enough for their job. Building on previous research, we expect workplace conversations to evoke this conversational achievement. Similarly to conversational acceptance, newcomers' conversational achievement, evoked by interactions one has at the workplace, are expected to fluctuate on a daily level, influencing their self-efficacy beliefs.

Hypothesis 2: We expect that on days when STEM newcomers experience higher conversational achievement, they experience a higher level of self-efficacy.

The moderating effect of self-prototypicality on conversational acceptance and achievement to feel self-efficacious. In a work environment like STEM where certain stereotypical characteristics predominate (e.g., being white, intelligent, male), non-prototypical STEM professionals may feel threatened, making them feel inferior and reduce the confidence in their abilities (Holleran et al., 2011; Van Veelen et al., 2019). Prior research revealed that minorities are more susceptible to subtle feelings due to such prevailing prejudices about marginalized groups (e.g., women in STEM) (Hall et al., 2019; Holleran et al., 2011). Therefore, we believe that it is important how someone sees themselves as a professional (prototypical or not) and whether this self-perception matches the organisation. Rainey et al. (2018) note that non-prototypical professionals feel less at home due to this unbalanced representation in STEM, yet finding yourself demographically similar to others in the field has a beneficial effect on experiencing acceptance and achievement for non-prototypical professionals. For example, research in social identity threat theory has shown that on days when women interacted

with men, and the conversations cued a lack of acceptance, they experienced increased social identity threat (Hall et al., 2019). This was not the case when the interaction occurred between female colleagues. Furthermore, the study of Blosser (2020) into improving engineering institutions for the preservation of black women is consistent with findings of Hall and colleagues. She states that subtle signs in interactions with interaction partners dissimilar to them cause a feeling of inferiority, lower performance, lower well-being, and contributes to identity threats (Blosser, 2020). In addition, Zeldin & Pajares (2000) found by using interviews that, especially for women, positive interactions had a great influence on career retention and academic behaviour. Particularly encouraging and verbally persuasive supervisors, support from peers, and interactions with relatives contributed to their self-efficacy beliefs in mathematics. This can be explained by the fact that it was important to the women that, besides themselves, others had belief in their competence regarding successfully accomplishing tasks (Zeldin & Pajares, 2000). These examples show that people with cultural backgrounds who are amongst the marginalized groups, and women in a male-dominated environment, experience stronger damaging effects from the perspective of having their social identity more easily threatened. Thus, expanding on previous findings, we suspect that effects on self-efficacy beliefs will not be the same for everyone, as the STEM sector contains a strong image of who belongs and who does not.

Every individual has several social identities, such as gender, ethnicity, professional identity, and age, which are more or less salient in particular social contexts (Logel, et al., 2009; Steele, Spencer, & Aaronson, 2002). For example, seeing yourself as a woman in a workplace with primarily men, or identifying yourself as an engineer when in the presence of colleagues of other functions. Social identity threat is the threat someone experiences in which one feels devalued based on one's social identity (Steele et al., 2002). We suggest that social identity threat theory functions as an underlying mechanism for understanding how daily interactions evoke conversational acceptance and achievement in both prototypical and non-prototypical newcomers and subsequently influence their self-efficacy. Because, when a specific social identity prevails in the workplace, this is associated as an inevitable element for optimal operation in this workplace (Steele et al., 2002). Literature in the STEM field shows that experiencing identity threat leads to negative outcomes, such as a decreased level of career confidence (Cadaret, Hartung, Subich, & Weigold, 2017; Van Veelen et al., 2019), lower well-being (Hall et al., 2015, 2019), and underperformance (Logel et al., 2009). Furthermore, a positively stereotyped social identity is less conspicuous than a negatively stereotyped identity (Barreto, 2015). This also indicates that as a corollary, employees whose social identity does not correspond to the indispensable identity or whose social identity is negatively stereotyped, experience social identity threat. It is important to understand that these processes mostly occur in the group that is societally, and by themselves, perceived as non-prototypical. Non-prototypical professionals do not feel threatened by the perception of others that they belong to a group that is negatively stereotyped, but they feel threatened when they believe that others have this perception of them (Van Laar et al.,

2019). Thus, using social identity threat as an explanatory mechanism, we expect workplace interactions that evoke conversational acceptance to have a greater effect on the self-efficacy beliefs of non-prototypical newcomers because, given the stereotypical image in STEM, they are being less accepted. We expect a lesser effect with prototypical newcomers, because they fit the ideal image of a typical STEM professional and are therefore more likely to be convinced of their inclusiveness.

To sum up, past studies applying interactions have shown that cues in conversations can trigger social identity threat (Hall et al., 2015, 2019), but can also increase a person's self-efficacy (Xanthopoulou et al., 2008) and conversational acceptance and achievement (Van Laar et al., 2019; Veldman et al., 2020). Perceiving such positive cues increases the level of self-efficacy (Zeldin & Pajares, 2000) and reduces the likelihood of leaving an organisation (Buse et al., 2013; Cech et al., 2011). However, such cues are expected to be less perceived by non-prototypical STEM professionals. For non-prototypical STEM newcomers, cues that indicate that they are good enough are important because there exists a certain stereotypical image that they do not match. For example, the effect of positive cues (e.g., the feeling of belonging, achieving) in interactions that women have in a male environment may compensate for the non-prototypical self-perception. Therefore, we assume that non-prototypical newcomers require interactions that not only stimulate their conversational acceptance, but also confirm their achievement to feel self-efficacious. Conversely, we therefore expect non-stimulating cues and interactions to be of less impact on self-efficacy beliefs of prototypical newcomers because they are already more likely to be convinced of their achievement feelings by complying with the ideal image.

> *Hypothesis 3a: The effect of conversational acceptance on non-prototypical STEM newcomers' self-efficacy beliefs, is moderated by self-prototypicality, such that it is stronger among non-prototypical relative to prototypical STEM newcomers.*

> *Hypothesis 3b: The effect of conversational achievement on non-prototypical STEM newcomers' self-efficacy beliefs, is moderated by self-prototypicality, such that it is stronger among non-prototypical relative to prototypical STEM professionals.*

The present research

Building on past studies, the current study applied a daily diary method to examine how daily workplace interactions affect self-efficacy beliefs by explaining this through conversational acceptance and conversational achievement. Additionally, effects of self-prototypicality on the relationship between conversational acceptance and achievement on self-efficacy is studied. This is because we expect that positive workplace interactions and cues that evoke conversational acceptance and achievement might be especially beneficial for non-prototypical STEM professionals to increase

their level of self-efficacy. Furthermore, in order to investigate dynamic effects over a short period of time, performing a diary study is highly suitable. However, limited research has been conducted using daily measurements, whilst conversational acceptance, conversational achievement, and self-efficacy beliefs fluctuate over short periods of time because of performance experiences and influence from others during interactions. Therefore, this study enriches existing literature by measuring these variables on a daily basis through interactions in the workplace.

When using a diary study, data is collected short-term at daily level and in people's natural life contexts instead of using control groups (Ohly, Sonnentag, Niessen, & Zapf, 2010). Conducting research in a natural setting ensures increased ecological validity and therefore generalisability to situations in which the effect occurs naturally (Hall et al., 2018). Another advantage is the reduction of retrospective bias, because data is collected on a daily basis (Reis & Gable, 2000) and shortly after the experience (Ohly et al., 2010). Therefore, the validity of the collected data increases, because participants have to rely less on their memory, which is known for its fading (Ohly et al., 2010). This is contrary to more general cross-sectional studies in which one moment in time is studied and participants are required to rely more on their memory. Furthermore, collected data can be analysed where it is taking place; within-person (Hamaker, 2012).

A within-person approach takes into account dynamic variance in individuals. Because what applies to the aggregate is not necessarily indicative of what is true for every individual in the population (Hamaker, 2012). Observing the dynamic variance through workplace interactions makes it possible to measure daily fluctuating effects on the level of self-efficacy. The within-person approach studies change within an individual over time (e.g., when an individual types faster, does he/she make more errors?). Contrary, a between-person approach is used, whereby differences between individuals are studied (e.g., do individuals who, in general, type faster make more errors?). Results are often mistakenly generalised to within-person relationships; e.g., when individuals who in general type faster make fewer mistakes. This does not mean that when an individual types faster, he/she makes fewer mistakes (Hamaker, 2012). Illustrating the within-person approach in the current study: on days when STEM newcomers experience conversational acceptance after having workplace interactions, they may experience a higher level of self-efficacy. This may be especially the case for people who perceive themselves as non-prototypical. Therefore, a within-person approach is more suited when studying variables that are expected to change depending upon the context and experiences. By conducting a diary study, data can be aggregated, analysed and generalized to the between-person level.

Research questions and model

The current study aimed at investigating the question: *what are the daily effects of conversational acceptance and conversational achievement on the daily level of self-efficacy among STEM professionals who are new to a STEM organisation*? The moderating effect of self-prototypicality was also studied, with the expectation that a stronger relationship would be present for non-prototypical STEM newcomers. Specifically, the following hypotheses were tested to examine the research model (see figure 1) and to answer the research question:

Hypothesis 1: We expect that on days when STEM newcomers experience higher conversational acceptance, they experience a higher level of self-efficacy.

Hypothesis 2: We expect that on days when STEM newcomers experience higher conversational achievement, they experience a higher level of self-efficacy.

Hypothesis 3a: The effect of conversational acceptance on non-prototypical STEM newcomers' self-efficacy beliefs, is moderated by self-prototypicality, such that it is stronger among non-prototypical relative to prototypical STEM newcomers.

Hypothesis 3b: The effect of conversational achievement on non-prototypical STEM newcomers' self-efficacy beliefs, is moderated by self-prototypicality, such that it is stronger among non-prototypical relative to prototypical STEM professionals.

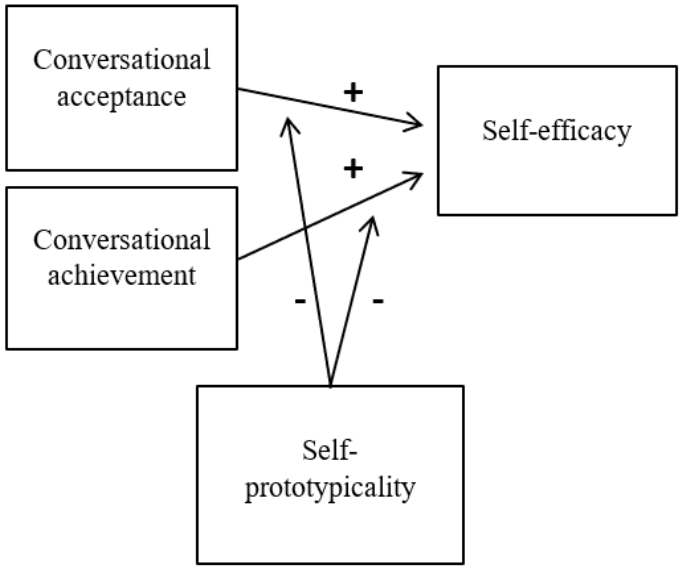

Figure 1 Research model

Method

It is important to highlight that the present study is part of the larger research project conducted by the Bridge the Gap consortium. Bridge the Gap is a project with the purpose of enabling prototypical and non-prototypical STEM newcomers to identify and feel confident about themselves as STEM professionals by using longitudinal and intervention studies (Endedijk, et al., 2021). Therefore, only the daily measurements and results concerning self-efficacy, conversational acceptance, conversational achievement, and self-prototypicality are discussed.

Participants

Participants were STEM professionals who started their new job at a new employer in the Dutch technical sector (i.e., newcomers). There were 14 organisations[1] involved and the data was collected in the months October 2020 until April 2021. A total of 171 newcomers agreed to participate in the research study, whereby 16 newcomers were not categorized as engineers and therefore removed from the study. Furthermore, eight newcomers had insufficient entries to participate (i.e., less than five days filled in during the three weeks of the study) and were therefore removed. In total, 147 STEM newcomers participated. Overall, the total number of entries of the 147 STEM newcomers was 2019, with participants having an average of 14.00 entries (*SD* = 2.34).

Of all participants, 43 were women (29.3%), 102 were men (69.4%), one reported itself as other (0.7%), and one was reported as unknown (0.7%). The age of participants was between 22 and 60 years (*M* = 34.06, *SD* = 10.03). With 130 participants having the Dutch nationality (88.4%), the remaining 17 participants were categorised as non-Dutch (11.6%). Participants' educational level consisted of higher secondary education (*N* = 15, 10.2%), university of applied sciences or university bachelor (*N* = 50, 34%), university master (*N* = 72, 49%), promotion or PhD (*N* = 4, 2.7%), and 6 (4.1%) unknown. Most of the participants (*N* = 37, 30%) graduated in 2020 or 2021 (*N* = 12, 8.2%), the other participants (one to nine participants per year) are fairly well distributed between 1989 and 2019. Furthermore, on average, participants reported having an average of 7 years of work experience (*M* = 6.95, *SD* = 9.93) and working an average of 38 hours per week (*M* = 38.69, *SD* = 3.15).

Recruitment of participants was accomplished by invoking the network of technical companies of the Bridge the Gap consortium, but also by invoking the researcher's personal and corporate network. Participants were enrolled in the study by the HR professional from their new organisation. Two methods were used: the HR professional scheduled the appointment for an intake interview between the researcher and the participant. Alternatively, the researcher periodically received a list of

[1] Data is not corrected at the level of organisations, i.e., individuals nested in organisations.

telephone numbers of the newcomers from the HR professional so newcomers could receive a call for an intake. In return, the participating organisations were guaranteed an organisation-specific advisory (on condition that they had a minimum of 20 newcomers participating) and a general report at the end of the study. As an encouragement and reward for participation, participants were provided with a detailed report on their professional identity after completion of the study.

Procedure

Participation started with an intake, a start questionnaire, then a daily questionnaire for three consecutive weeks, hereafter a weekly questionnaire for four consecutive weeks, and an end questionnaire. It should be noted that in the present study we only used the intake, the start questionnaire and the daily questionnaires for data collection. Therefore, only the procedure of the intake and start questionnaire and daily questionnaires is explained.

Intake and start questionnaire. Each month, a group of newcomers of the organisations attended an online intake in the first two weeks after starting in their new jobs, in which the study was explained to them. The intake time was approximately 15 minutes. The goal of the research and confidentiality in the handling of (personal) data was explained, and the voluntary nature of participation and the possibility of unjustified withdrawal from the survey was emphasized. Furthermore, participants were told that they were going to use a secured application and they were specifically asked whether they wished to take part in the study. After participants agreed to participate in the study, during the intake they were asked background information (e.g., career and study background, motivation for the job). Immediately after the intake, participants were sent the start questionnaire via email, which took about 15 minutes to complete.

Daily questionnaires. Participants started the daily questionnaires about two weeks after starting in their new job, so that there was enough time for them to finalise the intake procedure and start questionnaire. For the daily and weekly questionnaires, participants received an instruction by email explaining how to install the research app for the daily and weekly questionnaires. After installing, participants were then notified to complete the practice module and the first daily questionnaire, which would take about five minutes. The following day, the daily questionnaire was released at 15:00h and a reminder, by mobile phone notification, to complete the daily questionnaire was sent by the research app at 16:00h. This procedure was repeated during the first three weeks on working days.

The daily questionnaires were solely completed on working days (Monday to Friday). If the person was not working that day, it could be indicated in the questionnaire and then the questionnaire for that day was completed. The daily questionnaires were available until the next morning at 10.00h, after which the questionnaire was automatically closed by the app. After closing the app, participants

were unable to complete the questionnaire. Participants could resume participation the following day by reporting their responses in the questionnaire for that day.

In the third week, a researcher from the Bridge the Gap consortium contacted participants by telephone[2]. The aim of this contact was to give the participant the opportunity to provide comments and, as a researcher, to motivate the participant to proceed with the study. Furthermore, it was explained that from the fourth week onwards, the weekly questionnaires started.

Instrumentation

Within this study, four different software applications were used. The start questionnaire included the Career Compass of the BMS Lab (BMS Lab, n.d.) in order to collect feedback on the professional identity of the participants. Furthermore, the Ethica Data[3] programme was used for the daily questionnaires. This app is an end-to-end research platform that is appropriate for daily surveys by being usable on everyday devices such as smartphones (Ethica Data, n.d.). Lastly, the software tool Qualtrics was used for the final questionnaire.

Measures

A variety of concepts were measured, we only discuss the measurements that are relevant for the current study. A full overview of all measurements can be received from the first author. Of the variables, self-prototypicality was only measured in the start questionnaire, the other variables were measured on daily basis for the duration of three weeks. As recommended by Ohly et al. (2010) and Reis and Gable (2000), time spent by participants on the repetitive daily questionnaire is limited to 5-7 minutes per day by using a limited number of items per variable. Furthermore, the daily questions included formulations that was specific to that day. Table 1 shows an overview of information sources for the different types of study variable measurements.

Table 1
Consulted Information Sources for the Measurements of Study Variables

Variables	Intake	Start questionnaire	Daily questionnaires
1. Demographics	X		
2. Self-efficacy			X
3. Conversational acceptance			X
4. Conversational achievement			X
5. Self-prototypicality		X	

[2] This approach was introduced with the sixteenth participant.

[3] The research started with the use of TIIM (a software programme of the BMS Lab) for the first 16 participants. After encountering some software-related difficulties, the switch to Ethica Data was made.

Intake and start questionnaire (one-time measures)

The intake and start questionnaire aimed to obtain demographic information, including age, gender, work experience, and nationality. In addition, the start questionnaire included the study variable self-prototypicality.

Self-prototypicality. Self-prototypicality was measured once in the start questionnaire using a 7-point Likert scale (1 = totally disagree, 7 = totally agree). Based on Leach, Ellemers, and Barreto (2007), we developed two items to measure self-prototypicality: "In many respects, I think I am going to be a typical employee of this organisation" and "I think my colleagues will describe me as a typical employee at this organisation", r = 0.75, $p < 0.01$.

Daily measures

Conversational acceptance. Three items, based on Hall et al. (2015; 2018), were used to measure conversational acceptance on a 5-point Likert scale (1 = not at all, 5 = totally). The three items were: "During this interaction my interaction partner(s) was/were friendly", "During this interaction I felt accepted by my interaction partner(s)", and "During this interaction I was listened to", α_{range}[4] = 0.79-0.91.

Conversational achievement. Conversational achievement was measured with *being treated as competent*, using two items with a 5-point Likert scale (1 = not at all, 5 = totally). Both items were based on Hall et al. (2015; 2018): "During this interaction I had the idea that my interaction partner(s) perceived me as competent" and "I had the idea that my interaction partner(s) found my contribution useful", r_{range} = 0.59-0.80, $p < 0.01$.

Self-efficacy. We first adapted three items Veldman et al. (2020), who adjusted from the "confidence in learning" items from the Science Motivation Questionnaire from Glynn, Taasoobshirazi, and Brickman (2009) to measure self-efficacy on a 5-point Likert scale. The three items were: "Today I felt…" (1 = very incompetent, 5 = very competent), "About my performance today, I made…" (1 = many worries, 5 = few worries), and "The tasks I did today, were…" (1 = far below my level, 5 = far above my level). However, α_{range} = 0.25-0.64. Therefore, we excluded item three to ensure a higher reliability level, r_{range} = 0.34-0.63. This range is in line with the reporting by Veldman et al. (2020).

[4] The internal consistency of scales was measured by separately analysing each day and reporting the range of Pearson correlations (2 items) or Cronbach's alpha's (> 2 items).

Results

Statistical analyses

The multilevel data (i.e., days nested within participants) were analysed using multilevel analysis in IBM SPSS Statistics 27, with the mixed model procedure and maximum likelihood estimation. On first (day-)level, conversational acceptance and achievement were the independent variables and the dependent variable was self-efficacy. The multilevel analyses were performed following Aguinis, Gottfredson, and Culpepper, (2013), who described a four-step process, to which we added a sub-step to be able to separately examine the within- and between-effects of the predictors on self-efficacy. In step 1 we tested a null model where the intraclass correlation was calculated. Step 2a was to create a random intercept model with a fixed slope, to which the level 1 predictors (i.e., conversational acceptance or conversational achievement) were included to test both the within and between effects of the predictors on self-efficacy. In step 2b, the same random intercept model with a fixed slope was tested, but besides the level 1 variables (i.e., conversational acceptance or achievement), the level 2 predictor variable (i.e., self-prototypicality) was added. Step 3 was to create a model with a random intercept and allowing the slope of the level 1 predictor to randomly vary. This model assessed whether the relationship between conversational acceptance or conversational achievement and self-efficacy varied among newcomers. Step 4 was performing the cross-level interaction model, using Jamovi 1.6.23, to investigate whether self-prototypicality moderates the relationship between conversational acceptance/ conversational achievement and self-efficacy. The cross-level interaction model was only performed if a significant effect resulted from step 3. Finally, a simple slope analysis of the relationship between conversational acceptance or conversational achievement and self-efficacy for prototypical versus non-prototypical newcomers was studied only if significant results were obtained from the cross-level interaction model.

The two hypothesized predictors (i.e., conversational acceptance and conversational achievement) were examined using separate regressions on self-efficacy in multilevel analyses. The person-level (i.e., between-person, such as newcomers who in general experience more conversational acceptance also in general experience higher levels of self-efficacy beliefs) and the day-level (i.e., within-person, e.g., on days when newcomers experience more conversational acceptance their self-efficacy is higher than on days when they experience less conversational acceptance) were examined. Testing at both the person- and day-level was essential to understand which part of the variance is explained by differences between participants and which part is explained by differences within participants.

Correlations (between-persons)

Table 3 presents the means, standard deviations and correlations among all study variables and demographical information between participants (i.e., correlations for person means). The presented correlations suggest that higher conversational acceptance and higher conversational achievement are related to higher self-efficacy. Correlations also show that the more newcomers consider themselves to be a prototypical STEM professional the higher their levels of self-efficacy.

Table 3
Means (M), Standard Deviations (SD), and Correlation between Study Variables [a]

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Age	34.06	10.03	-										
2. Gender	1.34	0.66	-0.31**	-									
3. Nationality	1.12	0.32	-0.09	0.22**	-								
4. Educational level	2.46	0.72	-0.26**	0.20*	0.19*	-							
5. Year of graduation	2012.74	10.10	-0.90**	0.30**	0.16	0.42**	-						
6. Work experience in years	6.95	9.93	0.94**	-0.26**	-0.15	-0.37**	-0.96**	-					
7. Workhours per week	38.69	3.15	-0.08	-0.07	0.04	0.01	0.21*	-0.06	-				
8. Self-efficacy	3.97	0.61	0.26**	-0.15	0.03	-0.17*	-0.26**	0.28**	-0.10	-			
9. Conversational acceptance	4.51	0.39	0.03	0.02	0.01	-0.21*	-0.09	0.06	-0.08	0.57**	-		
10. Conversational achievement	4.05	0.51	0.11	-0.12	0.00	-0.26**	-0.13	0.11	-0.09	0.69**	0.81**	-	
11. Self-prototypicality [b]	4.71	1.07	0.11	0.08	-0.02	0.04	-0.07	0.04	-0.07	0.18*	-0.07	0.03	-

** $p < .01$, * $p < .05$. Scale categories: (1-5). [a] N=147, [b] *Scale category: (1-7).*
Gender: 1 = man, 2 = woman; Nationality: 1 = Dutch, 2 = Non-Dutch; Educational level: 1 = higher secondary education, 2 = university of applied sciences/ university bachelor, 3 = university master, 4 = promotion/ PhD.

Main analyses

The day-level independent variables were person mean centred to remove between-person variance (Ohly et al., 2010), by setting the average score of participants on both independent variables over all days to zero. Self-prototypicality was measured on second (person-)level and used as a moderator. The person-level independent variable (i.e., self-prototypicality) was centred on the grand mean by subtracting the overall mean such that the average across all participants was zero. Grand mean centring is suitable for simplifying interpretations. We were able to analyse exactly for each predictor which part on day-level and which part on person-level explained the effect on self-efficacy by centring variables person-mean and adding person means.

Intraclass Correlation

The Intraclass Correlation (ICC) was computed for the first (day-)level dependent variable to determine how much of the variance could be explained by differences between persons. A high ICC score shows that a larger variance in a variable may be explained by differences between persons. Results revealed that the ICC of self-efficacy was 0.49 (i.e., 49% of the variation could be explained to differences between persons and 51% to differences within persons).[5]

Do newcomers experience more self-efficacy on days that conversations evoke high conversational acceptance?

As Table 4 shows, hypothesis 1 was supported (step 2a); on days when newcomers experience higher conversational acceptance, they experience a higher level of self-efficacy (day-level effect, $B = 0.31$, $p < 0.001$). Furthermore, this similarly applies to newcomers who generally experience conversational acceptance; they also generally feel more confident about their own abilities (person-level effect, $B = 0.88$, $p < 0.001$). Step 3 showed a significant random slope ($B = 0.29$, $p < 0.001$), suggesting the relationship between conversational acceptance and self-efficacy to vary among newcomers. We therefore proceeded to step 4, the cross-level interaction model. However, hypothesis 3a was not supported as the interaction terms between conversational acceptance and self-prototypicality were not significant ($B = .00$, $p = .91$). This means that self-prototypicality does not moderate the relationship between conversational achievement and self-efficacy. Therefore, there was no justification for testing the relationship for prototypical versus non-prototypical newcomers. In addition, table 3 shows a main effect of self-prototypicality: the more newcomers felt prototypical, the higher self-efficacious they felt.

[5] The ICC of conversational acceptance was 0.30 (i.e., the variance that can be attributed to differences between persons is 30% and 70% to differences within persons). The ICC of conversational achievement was 0.28 (i.e., 28% could be explained to between-person variation and 72% to within-person variation).

Table 4
Results of Multilevel Modeling Analysis with Conversational Acceptance.

	Model				
Level and Variable	Null (Step 1)	Random Intercept and Fixed Slope (L1) (Step 2a)	Random Intercept and Fixed Slope (L1, L2) (Step 2b)	Random Intercept and Random Slope (Step 3)	Cross-level Interaction (Step 4)
Level 1					
Intercept (γ_{00})	4.504**	0.024	4.005**	4.005**	4.006**
	(0.032)	(0.487)	(0.054)	(0.054)	(0.054)
Conversational acceptance (γ_{10})		0.314**	0.290**	0.285**	0.269**
(within)		(0.030)	(0.031)	(0.034)	(0.035)
Conversational acceptance		0.879**			
(between)		(0.108)			
Level 2					
Self-prototypicality (γ_{01})			0.116*	0.116*	0.116*
			(0.051)	(0.051)	(0.051)
Cross-level interaction					
Conversational acceptance * Self-prototypicality (γ_{11})					0.004
					(0.033)
Variance components					
Within-person (L1) variance (σ^2)	0.278	0.325	0.315	0.311	0.311
Intercept (L2) variance (τ_{00})	0.118	0.220	0.330	0.331	0.331
Slope (L2) variance (τ_{11})				0.013	0.014
Additional information					
ICC	0.275				
–2 log likelihood (ML)	2473.777	2746.462	2425.796	2424.448	-1211.5762
Number of estimated parameters	3	5	5	6	7

Note: Unstandardized regression weights are presented. ML = maximum likelihood estimation; L1 = Level 1; L2 = Level 2; ICC = intraclass correlation coefficient. L1 N = 147 and L2 N = 126. Values in parentheses are standard errors.
* $p < .05$. ** $p < .01$.

Do newcomers experience higher self-efficacy on days they experience cues of achievement in interactions?

As expected, a day-level effect was found for newcomers experiencing higher levels of self-efficacy on days when they experience higher conversational achievement, hereby supporting hypothesis 2 (B = 0.29, $p < 0.001$) (see Table 5). In addition, a person-level effect was also found; newcomers who in general experience positive feelings about their achievements after interactions, experienced generally higher self-efficacy beliefs (B = 0.83, p <0.001). The results of step 3 showed a significant random slope (B = 0.28, $p < 0.001$), suggesting to proceed to step 4. In contrast, the cross-level interaction in the step 4 model did not produce any significant results (B = -.01, p = .65), which means there was no evidence found that supported the expectation that self-prototypicality moderates the relationship between conversational achievement and self-efficacy (i.e., hypothesis 3b). Therefore, here too, there was no justification for testing if (non-)prototypical newcomers experience stronger effects of conversational achievement on their self-efficacy beliefs.

Table 5
Results of Multilevel Modeling Analysis with Conversational Achievement.

	Model				
Level and Variable	Null (Step 1)	Random Intercept and Fixed Slope (L1) (Step 2a)	Random Intercept and Fixed Slope (L1, L2) (Step 2b)	Random Intercept and Random Slope (Step 3)	Cross-level Interaction (Step 4)
Level 1					
Intercept (γ_{00})	4.051**	0.608*	4.005**	4.005**	4.006**
	(0.042)	(0.299)	(0.054)	(0.054)	(0.054)
Conversational achievement (γ_{10})		0.289**	0.289**	0.275**	0.269**
(within)		(0.022)	(0.022)	(0.031)	(0.031)
Conversational achievement		0.833**			
(between)		(0.073)			
Level 2					
Self-prototypicality (γ_{01})			0.116*	0.116*	0.116*
			(0.051)	(0.051)	(0.051)
Cross-level interaction					
Conversational achievement * Self-prototypicality (γ_{11})					-0.014
					(0.030)
Variance components					
Within-person (L1) variance (σ^2)	0.514	0.309	0.295	0.151	0.272
Intercept (L2) variance (τ_{00})	0.195	0.163	0.332	0.172	0.335
Slope (L2) variance (τ_{11})				0.019	0.045
Additional information					
ICC	0.275				
–2 log likelihood (ML)	3348.488	2645.621	2352.575	2325.951	-1162.283
Number of estimated parameters	3	5	5	6	7

Note: Unstandardized regression weights are presented. ML = maximum likelihood estimation; L1 = Level 1; L2 = Level 2; ICC = intraclass correlation coefficient. L1 N = 147 and L2 N = 126. Values in parentheses are standard errors.
* $p < .05$. ** $p < .01$.

When do newcomers experience higher self-efficacy beliefs: when they experience conversational acceptance or conversational achievement?

An additional analysis was conducted to see which predictor is more important for self-efficacy. Here we have added conversational acceptance and conversational achievement together in the step 2 model. On day-level, the random intercept and fixed slope model demonstrated that newcomers experience higher levels of self-efficacy on days when they experience conversational achievement ($B = 0.24$, $p < 0.001$) than when they experience conversational acceptance ($B = 0.09$, $p = 0.02$). At person-level, we found significant results such that newcomers who generally experience more conversational achievement, generally experience more self-efficacy ($B = 0.83$, $p < 0.001$). When both predictors were combined in the step 2 model, the person-level effects of conversational acceptance on self-efficacy no longer appeared significant ($B = 0.01$, $p = 0.96$).

Discussion

This was the first study to use a daily diary method to explore the effects of conversational acceptance and conversational achievement on STEM newcomers' self-efficacy beliefs by focusing on workplace interactions. Part of the novelty of this study is based on the questionnaires that have been collected on a daily basis in the natural setting of STEM professional new to their organisation. More importantly, participating STEM professional were newcomers as they were observed in their first two months at a new organisation. The first period in a new job at a new organisation is crucial for the retention of STEM professionals, as more than 30% of the newcomers decide within a week whether they stay, or even leave the organisation within the first six months (Becker & Bolink, 2018). Researchers as Hall et al. (2015, 2019) previously showed that cues in workplace interactions could trigger feelings of social identity threat and burnout among women in STEM. Thus, it was important to investigate whether acceptance and achievement affects newcomers' self-efficacy through interactions, as this creates more insight into retaining STEM professionals in the STEM field.

This research demonstrates that STEM newcomers experience higher levels of self-efficacy on days they experience more conversational acceptance and conversational achievement. This finding is supports previous theories on the importance of interactions with colleagues. Walton and Cohen (2007), Johnson (2012), and Rainey et al. (2018) show that someone's perception of acceptance as a STEM newcomer in the organisation is mainly evoked by conversations they have with colleagues in the workplace. In this research, we additionally showed that interactions with colleagues are also crucial for newcomers' self-efficacy beliefs. The impact on self-efficacy can be explained in line with findings of Rodriguez and Blaney (2020), who found that negative cues in interactions and talking to male peers made Latinas in STEM feel less self-efficacious. This study shows that positive cues, feelings of being accepted in conversations, have a positive effect on a person's self-confidence in their own abilities to perform the job satisfactorily. Moreover, this result was also found on the person-level, suggesting that newcomers in STEM who in general experience being accepted in interactions, generally have more confidence in their abilities to function in their job. Our results also demonstrated on day-level that newcomers in STEM who experience high conversational achievement when talking with colleagues, have increased self-efficacy beliefs related to their job. This is consistent with the findings of Hilts et al. (2018), where marginalised students reported peer contact to be a predictor of their perceived competence and achievement. Furthermore, person-level tests indicated that newcomers who generally experience higher achievement feelings after interactions, in general feel more self-efficacious. When we investigated which of the predictors is most important to newcomers' self-efficacy beliefs, we discovered that conversational achievement is a better predictor than conversational acceptance. This is in line with Hilts et al. (2018) who showed that a student's perceived competence and achievement lowered the intention to leave a STEM major. Their research

also found that when taking into account the effects of achievement, feeling accepted does not predict the intention of leaving a STEM major.

We expected self-prototypicality to have a greater effect on the relationship between conversational acceptance and self-efficacy for non-prototypical newcomers, because they are less accepted given the stereotypical image in STEM. We expected the opposite for prototypical newcomers, which is that they need less confirmation because they match the ideal image of a STEM professional. We also expected a moderating effect of self-prototypicality on the relationship between conversational achievement and self-efficacy, in the sense that non-prototypical newcomers experienced a stronger effect on their self-efficacy beliefs through conversational achievement. It was therefore unexpectedly that results did not reveal that these effects were stronger amongst non-prototypical newcomers. These findings are unlike what Hall et al. (2019) reported in their study. They found that cues that evoked feelings of unacceptance in work-related interactions between non-prototypical (i.e., women) and prototypical STEM professionals caused feelings of social identity threat among non-prototypical STEM professionals.

Following the reasoning of Van Laar et al. (2019), finding no evidence for the moderating effect of self-prototypicality might be because the sample consisted of newcomers who considered *themselves* primarily prototypical STEM professionals. Since newcomers in this study tend to have a perception of themselves as mainly prototypical professionals, it mitigates the evoking effects of the cues in workplace interactions regarding feeling accepted and experiencing achievement. This is because prototypical newcomers are already convinced of their competence and ability to achieve and already feel a certain sense of inclusiveness to the STEM field. Furthermore, from the results it emerged that work experience was positively related to self-efficacy, i.e., the more work experience, the higher the self-efficacy beliefs. Participants reported having an average of seven years of work experience, this means that they might be more convincing of their prototypical being through practical experience. They have had the opportunity to obtain mastery experience in the role of a STEM professional and to utilise verbal persuasions, components that foster a person's self-efficacy beliefs (Bandura, 1997). As they may have a higher level of self-efficacy, and thus know that they are capable of performing their job as expected, they may consider themselves more of a prototypical professional (Block et al., 2018; Singh et al., 2013), and thus be less susceptible to cues in interactions. Moreover, self-prototypicality was measured in the start questionnaire, prior to the daily questionnaire, which means that the newcomer does not yet have insight into the typical STEM professional within his/her new organisation. Once the newcomer has been in contact with the STEM professionals in the organisation, the (self) image of the typical STEM professional may change, something that has not been taken into account during this study. Lastly, self-prototypicality has been examined as a moderator in this study. However, it could be that the effect of self-prototypicality occurs at an earlier

stage, meaning that newcomers who consider themselves non-prototypical have fewer interactions in which they feel accepted or competent enough. Newcomers who consider themselves prototypical at an earlier stage may have more interactions in which they feel accepted or competent, because they feel they fit the prototypical image.

Strengths, limitations and future directions

As with any research, this research has strengths and limitations. By performing a daily diary study, data was collected within person and on the same day the questioned experiences occurred, increasing the validity (Ohly et al., 2010). Moreover, data could be collected in the natural setting of where events are taking place and with multiple points in time (Ohly et al., 2010). More importantly, a power advantage is achieved by using a daily diary study. This is because the variables are measured on several days, which creates measurement points that are nested within persons. As a result, a high number of measurement points are created and there is less interference than when measuring between persons. Furthermore, the obtained data could be analysed on a day- and person-level to be able to more precisely state the effects of the variables.

Besides these strengths, this study also has its limitations. First, this study has taken into account a two-level nested model (days nested within individuals), whilst there was a three-level nested model (days nested within individuals; individuals nested within organisations). This means that much of the variation in participants' responses were mostly attributed to individuals, while we may have ignored the role of organisations (e.g., their onboarding process, culture, and employees) in this respect. Second, self-prototypicality was measured once because it was considered a stable person-level variable (a trait of someone) that does not fluctuate over the day. However, because the duration of the study is quite long, it cannot be ruled out that a person's self-perception can change in a period of three weeks. Especially since the sample consists partly of recent graduates who are only now starting to form a perception of themselves regarding their professional career in STEM. In addition, at least 34% of the newcomers already decide within one week whether they want to leave the organisation (Becker & Bolink, 2018) by considering whether they think they match the organisation and the job. Therefore, it would be advisable to include this variable in a future research, either on a daily basis, or to measure it at the beginning and again at the end. Third, social views of newcomers on the typical STEM professional have not been included in this research (although how newcomers see themselves have been included). It is important that, apart from the fact that newcomers do or do not define themselves as prototypical STEM professionals, this emerges from newcomers view on society's perception of STEM professionals. This makes it possible to determine whether non-prototypical newcomers feel threatened because they believe that others have this non-prototypical perception of them (Van Laar et al., 2019). Therefore, future research should include the

possibility to find out what newcomers really believe is the societal image of a STEM professional to determine what they classify as (non-) prototypical and the corresponding perceived threat.

Conclusion

To stimulate retention of engineers and to make them feel at home in the STEM work field, it is important to raise the self-efficacy beliefs of STEM newcomers. This research has shown that conversational acceptance and thus the sense of being part of the group contributes to this. This likewise applies to conversational achievement, in which newcomers are given the feeling of being able to perform and thus being competent enough to do the job as expected. The current study has shown that cues in workplace interactions affect newcomers' self-efficacy beliefs. Therefore, it is important for organisations and their employees to be aware of these cues in conversations. For example, a newcomer who is listened to during a conversation (e.g., by listening with attention) can already feel more accepted in the organisation. A similar effect for achievement can be stimulated by expressing in a conversation that efforts to contribute are appreciated, for example by asking questions or complimenting. Thus, increasing employers' awareness of the effects of cues in workplace interactions is important to ultimately make the STEM field a place like home to newcomers.

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