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Preparing Transitions: The Impact of Vocational Role Models on Occupational Aspirations Within Social Contexts

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Abstract

The formation of occupational aspirations, an important prerequisite of successful school-to-work transitions, is embedded in different social contexts, including youths' families and peers. At the same time, adolescents are guided by various career orientation activities, including vocational role models, that provide them with information on available career options and stimulate career decision-making. In this study, we combine both strands of research and examine how vocational role model effects unfold in the different social contexts that students are embedded in, potentially enabling or constraining intervention effects. Based on a large-scale role model intervention study comprising 1,190 students in Germany, we first examine how peer and family contexts are associated with students' occupational aspirations as key dimensions of social influence. Our results show that both peer and parental social contexts are related to students' career aspirations, with descriptive peer norms and injunctive peer and parent norms being the most relevant. Second, we show that unique encounters with vocational role models are, on average, related to increased occupational aspirations for the presented occupation, extending previous empirical findings to the VET context. Third, we examine whether and how role modelling interacts with students' social embeddedness. We do not find statistically significant interactions between the examined social contexts and the role model intervention. Hence, role model effects apply even in contexts that convey strong norms. Nevertheless, we find subtle patterns suggesting that role model effects are more pronounced when peers convey adverse norms and less knowledge regarding an occupation and when peers' self-efficacy is high. Theoretical and practical implications are discussed.

Keywords

career orientation; intervention; occupational aspirations; role models; social contexts

1. Introduction

The school-to-work transition is a challenging task in which adolescents have to navigate their own identity and decision-making within their social environment, alongside opportunity structures and many other factors (Yates, 2021). Career orientation processes are complex and vary for each individual; nevertheless, the development of occupational aspirations typically marks a crucial starting point in shaping career trajectories (Schoon & Parsons, 2002; Sewell et al., 1969; Ziegler, 2023). From an early age, children start developing occupational aspirations in light of social contexts and perceived social norms (Gottfredson, 1981). Prior research has emphasised the impact that peer groups, parents, and socio-economic status can have on adolescents' occupational aspirations and career choices (e.g., Buchmann & Dalton, 2002; Schoon & Parsons, 2002; Sewell et al., 1969; Zimmermann, 2018, 2020). Peers' occupational aspirations and social valuation of certain occupations, both in friendship groups and classroom contexts, may establish social norms on which occupations are socially desirable (Raabe & Wölfer, 2019; Sewell et al., 1969). Furthermore, peers act as reference groups, providing knowledge and serving as a standard of comparison (Singer, 2017). Additionally, socialisation in the family, information and guidance by parents, as well as the parental educational background and parental expectations, mark another meaningful social context with regards to occupations that adolescents could or should aspire to, perhaps also with the motive of maintaining a certain social status (Boudon, 1974; Bourdieu, 1987).

To support students in navigating school-to-work transitions, secondary schools in Germany have implemented various career orientation activities. Although the empirical evidence can be described as rather scarce overall, previous studies have shown that career orientation activities can support young people, for example by broadening their career aspirations (e.g., Piepenburg & Fervers, 2022; S. L. Turner & Lapan, 2005) or increasing their career competences (e.g., Kunert & Sommer, 2023; Ratschinski et al., 2018). These findings highlight the importance of vocational guidance opportunities for increasing young people's career choice skills. Increasing aspirations for a wider range of occupations is a common goal of career guidance activities, both because young people's career aspirations are still stratified along specific social categories like gender (e.g., Barone et al., 2018; Yazilitas et al., 2013) and social status (e.g., Herbaut & Geven, 2020), and because young people have a limited field of occupational aspirations (e.g., Covacevich et al., 2021). This is even more important as the shortage of skilled workers has become more severe in Germany due to a number of factors, particularly in light of demographic change and especially in the vocational education and training (VET) sector (Bundesagentur für Arbeit, 2024; Oeynhausen et al., 2023). This makes it important to increase the visibility of occupations in this sector from a societal and policy perspective. Recently, vocational role models have been increasingly implemented in career guidance activities at school to address this issue (e.g., Athanasiadi et al., 2020). Prior research has shown that role models can increase occupational aspirations, for example among girls for academic STEM occupations (Gladstone & Cimpian, 2021; Lawner et al., 2019).

Therefore, considering that both social contexts and role model interventions have been shown to influence adolescents' occupational aspirations, we investigate how these influences interact with each other and whether vocational role models can increase students' occupational aspirations above and beyond long-term influences conveyed in peer and parental social contexts. The majority of previous intervention studies have investigated average treatment effects, which may, however, disregard the possibility that students could differ in their response to vocational role models depending on their embeddedness in different social

contexts. Perceived parental and peer contexts may alter the way students incorporate external cues from career orientation activities in their career-decision process (e.g., Bruch & Feinberg, 2017). For example, in the presence of strong normative expectations from social contexts, role modelling may be less influential, preventing students from engaging in thoughtful and reflective decision-making, an expectation routed in dual-process theories of decision-making (see, e.g., Esser, 1999; Evans & Frankish, 2009; Paternoster et al., 2011; Xu, 2021). To date, we are not aware of any study that has explicitly modelled how career and role model interventions unfold in different peer and parental social contexts. Given that social contexts influence occupational aspirations as outlined above, research on this issue is important to inform and further improve career orientation activities and their effectiveness for students in the school-to-work transition.

Thus, the aim of this study is first to investigate how different social contexts within the peer group and the family shape individuals' occupational aspirations for certain VET occupations (RQ1). In contrast to previous studies, we compare the effects of key dimensions of social influence, distinguishing between normative social influence from parents and peers, as well as informational and comparative peer effects.

Following this, the study explores how the short-term event of meeting a vocational role model in school impacts students' aspirations for the presented VET occupation, considering the influences of long-term social contexts in the family, peer group, and school (RQ2).

Lastly, this study examines whether the effect of a vocational role model on students' aspirations for the respective occupation is moderated by peer and parent social contexts, i.e., whether the vocational role model increases students' aspirations for the respective occupation more strongly in certain social contexts (RQ3).

To achieve this aim, we analysed primary data from a quasi-experimental intervention study (the BIBB-TUDa Career Orientation Study) on VET role models among a regional sample of secondary school students in Germany.

2. Theoretical Framework

2.1. The Impact of Social Contexts on Occupational Aspirations

A social context can be defined as a structure that is connected to expectations, opportunities, and restrictions for individuals, thereby influencing aspirations and behaviour (Friedrichs & Nonnenmacher, 2014). Early research has highlighted the impact of families, peers, and schools on the development of occupational aspirations, as specified in the "Wisconsin model" by Sewell et al. (1969, 1970). Accordingly, significant others shape young people's aspirations through parental expectations, friends' educational and occupational aspirations, and teachers' encouragement (Sewell et al., 1969). Social contexts become relevant through the expression of normative attitudes that shape individuals' perceived opportunities and restrictions (Friedrichs & Nonnenmacher, 2014). A common distinction of social norms affecting a person's actions is made between injunctive norms "which [guide] the behaviour via the perception of how most others would approve/disapprove of a person's conduct," and descriptive norms "which [guide] the behaviour via the perception of how most others would behave" (Cialdini et al., 1991, p. 201). In addition, social contexts can be understood as opportunity structures that provide resources and transmit knowledge via informational social influence (Guimond, 1997). Finally, social contexts can act as a frame of reference in

students' career orientation process and provide grounds for comparative social influence (Festinger, 1954). As prior research suggests, peers and parents are particularly influential in students' career orientation process (e.g., Raabe & Wölfer, 2019; Zimmermann, 2020). Respective theoretical and empirical findings are outlined below.

2.1.1. Peer Influences

Throughout adolescence, the school context and classmates become more important as a frame of reference for young people as they spend time together and share similar developmental tasks and transitions (LaFontana & Cillessen, 2010; Wicht & Ludwig-Mayerhofer, 2014). Although there is empirical evidence that close friends may be more relevant to educational decisions in comparison to loose ties (e.g., Rubineau et al., 2024), classroom contexts remain structurally relevant for students' career decision-making. For example, Raabe and Wölfer (2019) have shown that both the educational aspirations of the friendship group and the educational aspirations of classmates are relevant to the development of students' educational aspirations. Peer effects can be related to the development of occupational aspirations via normative social influence, informational social influence, and social influence based on social comparison (e.g., Festinger, 1954; Laursen & Veenstra, 2021; J. C. Turner, 1991).

First, in the process of peer socialisation, similar sets of values and norms are transmitted such that students become more similar to their peers in their attitudes and aspirations through norm enforcement (Laursen & Veenstra, 2021). The desire to be accepted by the peer group is strong in adolescence (e.g., Kiesler, 1969; Osterman, 2000). Peer conformity is routed in the desire to belong and gain status, maintain a positive self-concept, and make accurate decisions (Cialdini & Goldstein, 2004; Laursen & Veenstra, 2021). Different studies have empirically assessed this, showing, for example, that individual aspirations are related to the average aspirations in the classroom (e.g., Raabe et al., 2019; Raabe & Wölfer, 2019; Zimmermann, 2020). Accordingly, we expect that students express higher aspirations towards a VET occupation when their classmates also have higher aspirations for this occupation (H1a, descriptive normative peer effects).

Such normative peer effects might also be injunctive in nature in the way that students consider their peers' social approval or disapproval of occupations in their career choice process, which might be negatively framed as "peer pressure" (Clasen & Brown, 1985; Laursen & Veenstra, 2021). For example, students tend to adjust their aspirations to those of their friends (e.g., Raabe et al., 2019). Hence, we expect that students express higher aspirations towards a VET occupation when they expect a higher social valuation of this occupation by their peers (H1b, injunctive normative peer effects).

Second, peer influence can be informational in nature, contributing to gain representations of reality (Festinger, 1954). Career choices can be thought of as a decision-making task under high uncertainty since students may not be perfectly informed about all of the available career options. Therefore, social influence from classmates can contribute to students' knowledge about specific occupations through the dissemination of information in daily interaction. Hence, we expect that students express higher aspirations towards a VET occupation when their classmates are well informed about this occupation (H1c, informational social influence).

Third, peer effects may become relevant through social comparison processes. Social comparison is a fundamental need of human behaviour that serves to evaluate one's own abilities, goals, and ambitions by comparing oneself to others (Festinger, 1954). Accordingly, individuals may adjust their aspirations or

behaviour based on how they perceive themselves relative to others. A reoccurring finding in the literature suggests that at the same level of ability, students will develop more negative academic self-concepts in the presence of higher-achieving peers through negative upward comparisons, known as the big-fish-little-pond effect (Marsh, 1987). A comparable relationship has also been found for the development of occupational aspirations (Nagengast & Marsh, 2012); for example, youths develop lower aspirations for STEM fields when the overall classroom environment displays high mathematical achievement (Mann et al., 2015; Beckmann, 2021). In the setting of career orientation, individuals may, therefore, adjust their occupational aspirations based on comparisons with their classmates. If students perceive their classmates as more successful and confident regarding a specific occupation, they might be more reluctant to express an aspiration toward it, in line with negative upward comparisons suggested by the big-fish-little-pond effect. Thus, we expect that students express lower aspirations towards a VET occupation when their classmates show higher levels of self-efficacy for this occupation (H1d, comparative social influence).

2.1.2. Parent Influences

Socialisation processes in the family, such as informational, motivational, and guidance functions of parents as well as the parental educational background and their expectations have been shown to impact children's educational and occupational aspirations (e.g., Breen & Jonsson, 2005; Broschinski et al., 2022). Bourdieu (1987) emphasised the socialisation function of parents concerning class-specific experiences that differ depending on the educational context of parents and shape work-related family values and norms. These values and norms are "adapted" by the growing children (Bourdieu, 1987). Class-specific educational inequalities and their effects on aspirations and educational pathways have received major focus in empirical research (e.g., R. Becker & Hecken, 2008; B. Becker & Tuppat, 2013; Kleinert & Jacob, 2024). Recent administrative German data shows a strong link between family socio-economic background and children's career development (Autor:innengruppe Bildungsberichterstattung, 2024). Further, not only educational status but also occupations tend to be transmitted from parents to their children (Mischler & Ulrich, 2018). According to parents' socio-economic background and class-specific family experiences and socialisation, adolescents whose parents have a vocational qualification may aspire more often towards VET occupations than children with an academic family background. We therefore expect that students' aspirations towards a VET occupation are lower when parents have an academic degree compared to students whose parents have a VET degree or no occupational degree (H2a, descriptive normative parent effects).

The Wisconsin Model (Sewell et al., 1969, 1970) postulates a significant impact of parental expectations on adolescents' occupational aspirations. The desire for belonging and social appreciation through parents is especially strong for career choices when adolescents seek to build their own social identity (Gottfredson, 2005). There is strong empirical evidence that adolescents take the occupational expectations of their parents into account (e.g., Fischer-Browne, 2022; Matthes, 2019; Schoon & Parsons, 2002; Zimmermann, 2020), perhaps to fulfil parents' interest in maintaining a social status (Boudon, 1974) and to avoid social costs for example through family conflict (Schmaus et al., 2024). Hence, we expect that students express higher aspirations towards a VET occupation when they expect a higher social valuation of this occupation from their parents (H2b, injunctive normative parent effects).

Figure 1 conceptually summarises the outlined hypotheses regarding the impact of peer and parent contexts on occupational aspirations.

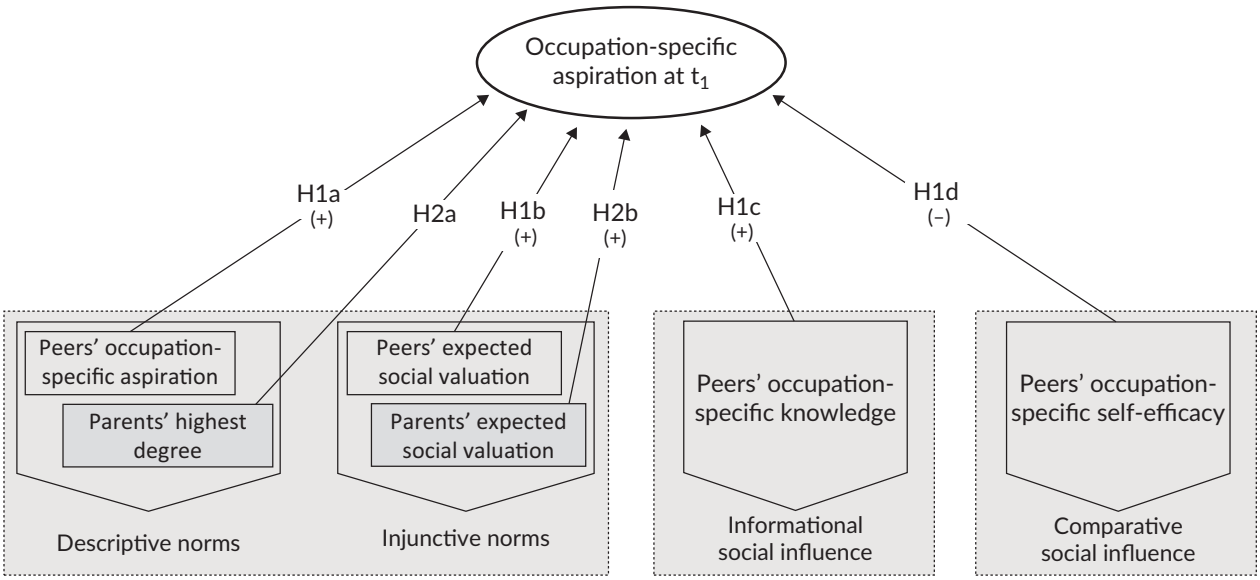

Figure 1. Hypotheses: The association of social context characteristics and occupational aspirations.

2.2. The Impact of Vocational Role Models on Occupational Aspirations

Career choice is a complex, long-lasting process shaped by individuals' identities, interests, and abilities, among other restricting and enabling factors (e.g., Yates, 2021). In addition to the long-term social contexts outlined above, research points to the relevance of short-term vocational guidance interventions for the development of students' occupational aspirations (e.g., career workshops; see Jemini Gashi et al., 2023; Mutlu et al., 2023; Piepenburg & Fervers, 2022; S. L. Turner & Lapan, 2005). These guidance activities stimulate students' career decision-making, for example, by educating them about the world of work or even about students themselves, facilitating the cognitively demanding task of choosing among available career options. Even if career guidance activities are incidental, they may create new insights and opportunities, as posited by the happenstance learning theory (Krumboltz, 2009; Mitchell et al., 1999). Vocational role models present another short-term career orientation approach. As Morgenroth et al. (2015) argue, role models have three main functions:

> (a) [They] show us how to perform a skill and achieve a goal—they are *behavioral models*; (b) they show us that a goal is attainable—they are *representations of the possible*, and (c) they make a goal desirable—they are *inspirations*. (p. 467)

Thus, vocational role models may function as a career orientation approach that is not only based on providing information but also involves motivational and emotional cues while offering opportunities for identification. Role models may increase the motivation both for existing goals and also inspire new goals by increasing the subjectively expected probability of success and the subjective value connected to these goals (expectancy-value theories of motivation; Morgenroth et al., 2015). In their systematic review of STEM role models, Gladstone and Cimpian (2021) propose that role models are "individuals who can positively shape a student's motivation by acting as a successful exemplar" (p. 1). Social learning theory (Bandura, 1972) highlights the relevance of observational learning for developing career aspirations, adapting and imitating behaviour by observing others perceived as similar and identifiable. In the process of students developing their career orientation, we can assume that vocational role models of similar age may stimulate

students' thoughtful and reflective decision-making about their attitudes and valuation of the presented occupation, as students process new information about the presented occupations through the personal and motivational insights of role models. There is abundant empirical evidence, mainly for academic STEM occupations, that even short-term role models can contribute to increasing STEM aspirations (e.g., Gladstone & Cimpian, 2021; Lawner et al., 2019). The role model's perceived competence, whether their success was perceived as attainable, and the perceived similarity to students have been shown to moderate STEM role model effects (Gladstone & Cimpian, 2021). From a theoretical perspective, gender is a crucial dimension in the role modelling process, first, because gender is a relevant social category in identification and social influence processes (e.g., Spears, 2021) and, second, because counter-stereotypical role models may provide relevant counter-evidence to break stereotypes related to gender-skewed occupations (e.g., Stout et al., 2011). The empirical evidence is, however, less clear and provides inconclusive results on gendered role modelling effects (see, e.g., Carsten Conner & Danielson, 2016; Cheryan et al., 2011; Stout et al., 2011).

We suppose that the theoretical and empirical arguments outlined above can also be applied to role models in VET occupations. Therefore, we expect that vocational role models will, on average, increase students' aspirations for the presented VET occupation (H3).

2.3. The Interrelation of Vocational Role Models and Social Contexts

As outlined above, vocational role models mark a short-term social influence that may encourage reflection on potential career options. According to the model of frame selection (MFS) by Esser (1999) and Kroneberg (2005, 2010, 2014), individuals follow an *automatic-spontaneous* (as) mode or a *reflecting-calculating* (rc) mode in their actions and decision-making. The interpretation of a situation (frame selection) and normative influences or other internalised routines shape which mode individuals will use (Kroneberg et al., 2010). According to the MFS, the as-mode is more likely to be activated when stronger and unambiguous norms are perceived for the situation, and a clear action script is available, reducing the time, energy, and mental effort needed to decide on actions (Kroneberg, 2014). Individuals will be more likely to follow the rc-mode in uncertain situations, ambiguous scripts, or unclear social norms (Esser, 1999; Kroneberg, 2005). In the rc-mode, individuals evaluate the available alternatives according to the subjective expected utility with calculated incentives (i.e., costs, benefits, and expectations), with social norms being just one of many other factors taken into account (Kroneberg et al., 2010). Career decision-making can theoretically be assumed to involve both processes: If strong norms and clear action scripts are perceived, individuals are assumed to follow the as-mode, thereby reducing the complexity of occupational choice. Adolescents are also assumed to weigh career options and, according to the rc-mode, take a variety of options into account, for example, when considering their personal professional interests and how they match with occupations (e.g., Holland, 1997).

Applied to a vocational role model intervention, the MFS suggests that new information and different viewpoints transmitted through a vocational role model are considered in the rc-mode, unless strong social norms prevent students from reflective thinking and, therefore, they stay in the as-mode and follow the perceived normative action scripts from their social environment. Therefore, we would expect that vocational role models can affect aspirations for their presented occupation more strongly when social norms are less salient. This would imply that both affirmative and opposing norms towards the presented VET occupation would be associated with smaller role model effects and that more neutral normative

positions by peers and parents allow for more reflective thinking and, hence, result in a stronger role model effect on occupational aspirations. However, in line with empirical findings on peers' and parents' influences on occupational aspirations outlined in Sections 2.1.1 and 2.1.2, we expect that also the effect of a vocational role model intervention on increasing aspirations for the presented occupations is influenced (i.e., moderated) by peers' and parents' social context characteristics. In particular, we expect individuals to seek conformity with the descriptive and injunctive norms they perceive from parents and peers (Cialdini & Goldstein, 2004; Laursen & Veenstra, 2021). Non-conformity with social norms could carry social costs, which are assumed to be highly relevant in the subjective expected utility assessment, given the substantial empirical findings on parental and peer influences on occupational aspirations. Hence, we expect that vocational role models will increase students' aspirations for the presented VET occupation more strongly when this occupation is supported by affirmative descriptive and injunctive norms by parents and peers (H4a).

With regards to informational peer effects, we expect that vocational role models will increase students' aspirations for the presented VET occupation more strongly when classmates have less knowledge about this occupation before the intervention (H4b), as the role model could function as an alternative information channel to peers outlined in Section 2.2.

With regards to comparative peer effects, we expect that when peers display a high degree of occupation-specific self-efficacy, this may pose a barrier for students to adapt their aspirations toward the presented occupation. Hence, we expect that vocational role models will increase students' aspirations for the presented VET occupation more strongly when classmates show lower levels of self-efficacy for this occupation (H4c), in line with the big-fish-little-pond effect outlined in section 2.1.1.

Figure 2 conceptually summarises the outlined hypotheses regarding the impact of vocational role models on occupational aspirations and the moderating effects of peer and parent contexts.

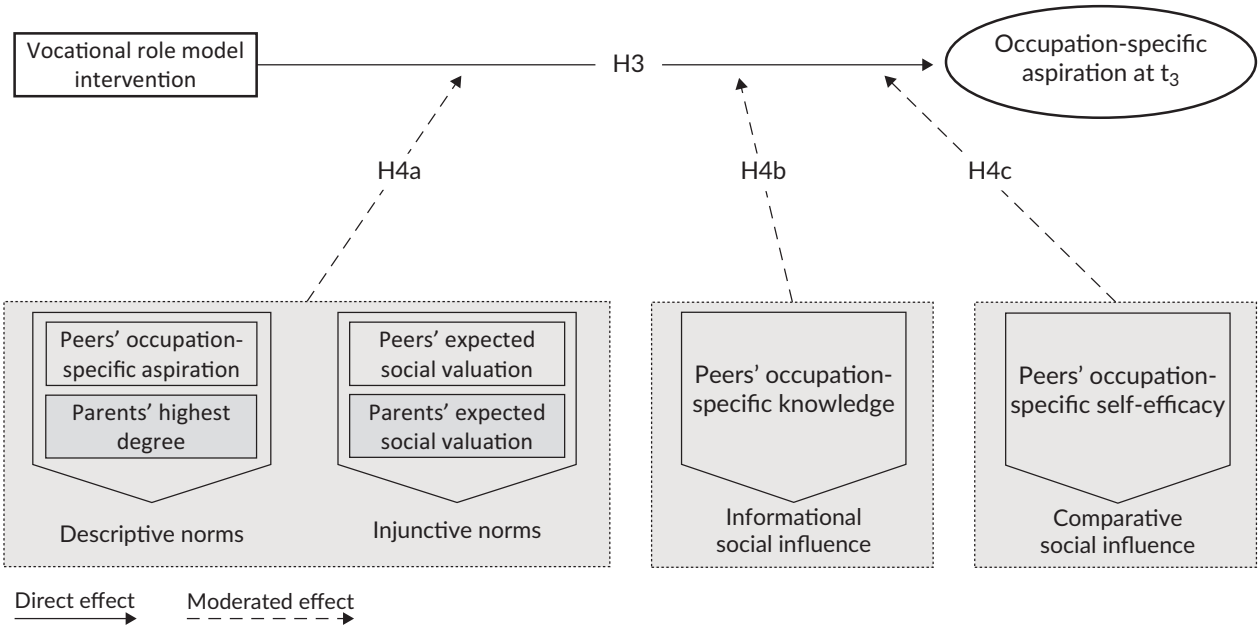

Figure 2. Hypotheses: Treatment effect and effect heterogeneities by peer and parent context characteristics.

3. Methodology

3.1. The Vocational Role Model Intervention

The "VET ambassadors" (German: *Ausbildungsbotschafter*), a career orientation initiative, was implemented by different local chambers of industry and commerce and chambers of crafts in Germany, in support of regional governments and the Federal Ministry of Education and Research. The aim is to strengthen the visibility and attractiveness of VET and to broaden students' occupational aspirations (MAGS NRW, n.d.). To achieve this goal, apprentices (typically in their second or third year of apprenticeship) visit secondary school classes and present their vocational occupations. During a 45–60 minute presentation, usually, two or three VET ambassadors provide information and personal insights on different topics related to their VET occupation, for example, daily tasks, work conditions, career progression opportunities, their career choice, and how their social environment reacts to their occupation. Afterwards, they answer students' questions. The presented occupations cover many different fields from the dual VET system, for example, IT, commercial occupations (e.g., office management), or crafts (e.g., electricians).

As part of the BIBB-TUDa Career Orientation Study (German: BIBB-TUDa-Berufsorientierungsstudie), conducted jointly by our team at the Federal Institute for Vocational Education and Training (BIBB) and the Technical University of Darmstadt (TUDa), over 70 visits by VET ambassadors at a regional sample of secondary schools in North Rhine-Westphalia were evaluated in terms of their effect on individuals' aspirations for the presented VET occupations. In a quasi-experimental research design (Figure 3), data was collected from students immediately before the VET ambassadors' presentation (survey t_1, pre-measure), immediately after the intervention (survey t_2), and approximately seven to 11 weeks (Median: 8.14, IQR: 7.00–11.00, Range: 4.00–13.29) after the role models had visited the school (survey t_3, post measure).

The sample depended on schools taking part in the VET ambassadors project as organised by regional chambers of industry and commerce and chambers of crafts. Schools were assigned to the treatment group and the control group pragmatically based on the regional chambers' coordination. The control group participated in the intervention after the post-measure was collected (Median distance between measurements: 6.00 weeks, IQR: 4.29–10.43, Range: 4.00–25.00). At least two classes participated per school. In most cases, schools either participated as part of the treatment group or the control group.

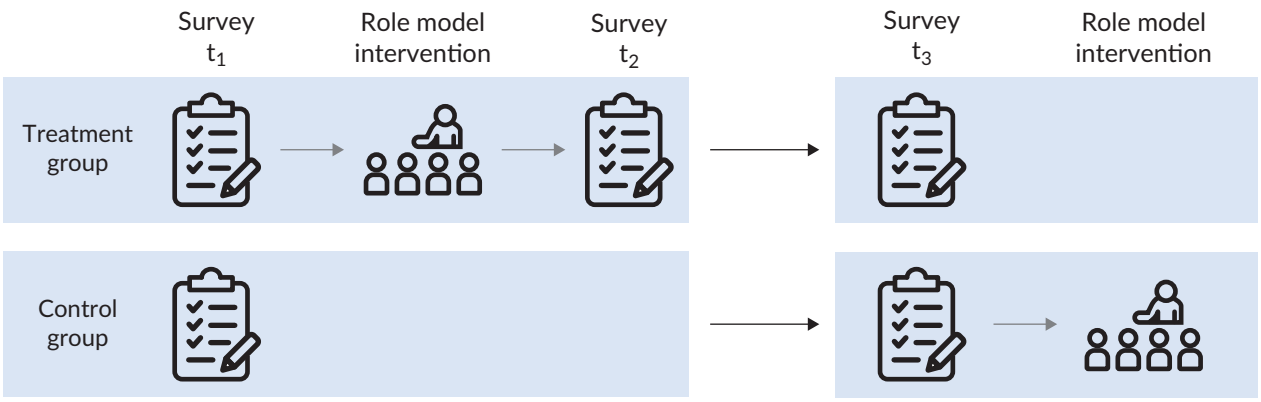

Figure 3. Quasi-experimental research design of the BIBB-TUDa Career Orientation Study.

However, at some schools, data was collected both for classes in the treatment group and the control group, but in different school years. Data collection took place in the school years 2021–2022 and 2022–2023 through a self-administered pencil-and-paper or online questionnaire in the classroom setting. The pre- and post-measures data were later linked through self-generated identification codes (SGIC).

3.2. Measures

3.2.1. Occupation-Specific Aspiration

The participants were asked at t_1 and t_3 to respond to two items on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*) if they would like to do an apprenticeship or work in the VET occupation presented by the VET ambassador. The average score of these two items was computed to receive an overall score of the individual's aspiration for this occupation. The internal reliability of this measure was high with Cronbach's $\alpha = .938$ in t_1 and $\alpha = .950$ in t_3.

3.2.2. Peers

Characteristics of peer group contexts were either computed as aggregate classroom measures based on students' responses at t_1 or reflect students' individual perceptions of their friendship group.

Peers' occupation-specific aspiration for occupations presented by the VET ambassadors was computed as the average value of all students' occupation-specific aspirations in each classroom context. The resulting aggregate occupation-specific aspiration in each classroom was used to operationalise *descriptive normative peer effects*.

Peers' occupation-specific knowledge of occupations presented by the VET ambassadors was computed as an aggregate variable based on how well students in the classroom reported knowing the occupation and if they could picture what someone working in this occupation does (Cronbach's $\alpha = .723$). Higher values on the 5-point scale indicate better knowledge of the specific occupation. This measure was used to operationalise *informational peer effects*.

Peers' occupation-specific self-efficacy for occupations presented by the VET ambassadors was computed as an aggregate variable based on how students in the classroom agreed to the two statements that they are confident in their ability to learn the occupation and that they would have a good chance of securing an apprenticeship in this occupation (Cronbach's $\alpha = .859$). Higher values on the 5-point scale indicate higher self-efficacy with regard to the specific occupation. This measure was used to operationalise *comparative peer effects*.

Peers' expected social valuation of the specific occupation presented by VET ambassadors was assessed through a combined score for two items, asking students if they expect to receive social approval from their friends for working in this occupation and if they think that their friends would find it 'cool' if they worked in this occupation (Cronbach's $\alpha = .861$). Higher values on the 5-point scale indicate higher expected social valuation for the specific occupation. In contrast to the other peer group characteristics, this variable is not related to classmates and thus not aggregated at the classroom-level but aims at the individual's *friends*, who may or may not be in the same class. This measure was used to operationalise *injunctive normative peer effects*.

3.2.3. Parents

Characteristics of parent contexts were measured based on students' responses at t_1.

Parents' expected social valuation of the specific occupation presented by VET ambassadors was assessed similarly to peers' expected social valuation of the presented occupation. Students responded on a scale from 1 to 5 how they agree with two statements that they would receive social approval from their parents for working in this occupation and if they think that their parents would like it if they worked in this occupation (Cronbach's $\alpha = .896$). This measure was used to operationalise *injunctive norms for parents*.

Parents' highest degree was categorised based on students' responses for each of their parents. If both parents had no occupational degree or the information was unknown for one of the parents, they were categorised as (1) *no occupational degree*. Students with *at least one parent with VET degree* were categorised as (2). If at least one parent had an academic degree and the other parent had a VET degree, no degree, or the information was unknown, they were categorised as (3) *at least one parent with academic degree*. If both parents had an academic degree, they were categorised as (4) *both parents with academic degree*. The final group (5) captures students who did not know their parents' degree, did not answer, or provided invalid responses. This measure was used to operationalise *descriptive norms for parents*.

3.2.4. Control Variables

Control variables were used to account for differences between treatment and control groups at baseline:

- *Gender*: Students were asked to respond if their gender was male (0), female (1), or diverse (2).
- The individual scores of the respective peer aggregate variable outlined above were used as control variables for *individual occupation-specific knowledge* and *individual occupation-specific self-efficacy*.
- *General occupational aspirations*: A dummy variable captured whether students indicated they might have already developed their own occupational aspirations (1) or that they did not yet have any specific occupational aspirations (0).
- *Language spoken at home*: Students were asked about languages they learned as a child in their family home, which we used as an approximate measure of migration background. Category (0) includes all students who learned only German and category (1) includes students who responded that they also learned other languages than German in their family home. It should be noted that this measure represents an approximation of migration background, as not all people with a migration background learn other languages than German in their family home.
- *School type*: The school system in Germany is federally administered. In North Rhine-Westphalia, students leave primary school after grade 4 at 10 or 11 years of age and continue secondary school in either of four different school types: (0) lower secondary school (*Hauptschule*), (1) intermediate secondary school (*Realschule*), (2) upper secondary school (*Gymnasium*), or (3) comprehensive school (*Gesamtschule*).
- *School grade level*: The grade level accounts for students' approximate age and prior career orientation activities.
- *Occupation*: The 18 occupations used in the "occupation-specific" survey questions were used as a categorical control variable to account for occupation-specific differences, for example, in terms of

popularity, social valuation, or gender distributions within these occupations. For the treatment group, the surveyed occupation corresponded to the occupation presented by the VET ambassadors.
- *Distance between pre- and post-measures*: The distance between the surveys at t_1 and t_3 was controlled for when examining treatment effects.

3.3. Sample Description

A total of 2,396 participants were surveyed at the outset of the study, of which 1,614 students (67.36%) participated both at t_1 and t_3. The sample attrition is mainly due to students' absence on survey days and failure to match some participants due to missing matching information. After preparing the data for analysis, 1,190 students (77 classes) from 20 different schools comprised our study sample. Since most classes were visited by two VET ambassadors (71.03% of students; 20.90% of students were visited by one VET ambassador and 8.07% were visited by three VET ambassadors), each presenting their occupation, the data results in 2,012 occupation-specific observations used for analysis. Due to this data structure, students of the treatment group were included once or twice in the sample when they were visited by one or two VET ambassadors, respectively. In the case of three VET ambassadors, students were surveyed only for two of the VET ambassadors' occupations. Participants with missing information on any of the measures outlined above were excluded from the study's sample (n = 134). Further, data on each VET occupation presented by ambassadors had to be available for both the treatment and the control group in order for the occupation to be included in the present study. With these sample restrictions in place, no participants in upper secondary school remained in the sample for analysis. The demographic information of the final study sample (n = 1,190 individuals) is displayed in Table 1 for the treatment and control groups, respectively.

3.4. Analysis

3.4.1. Specification of the Multilevel Model

Three-level multilevel models were used to account for the hierarchical data structure of occupation-specific and repeated observations (level 1) being nested in individuals (level 2) who are nested in classrooms (level 3). First, a cross-sectional intercept-only multilevel model of the occupation-specific aspiration as dependent variable was conducted to assess the variance components for the higher levels. The estimated variance component of the classroom intercepts was 0.030 (CI 0.016–0.059), which was rather small but statistically significant. The intraclass correlation (ICC) indicated that the classroom level accounted for 3.26% of the total variance. To account for the nesting of classrooms within schools, cluster robust standard errors at the school level were calculated. All statistical analyses were conducted using Stata 18.

3.4.2. Cross-Sectional Analyses at t_1

To examine the association of social context characteristics and occupation-specific aspirations at baseline (RQ1; Figure 1), random intercept fixed slope multilevel models of students' occupational aspirations and the characteristics of peers and parent contexts were conducted with the baseline sample at t_1. We conducted random intercept and fixed slope models because we theoretically expect differences in the intercepts between classes depending on classmates' characteristics but similar impacts (i.e., slopes) of the normative, informational, and comparative social influences in each class. The model presented in this article considered

Table 1. Sample characteristics.

Characteristic	Treatment Group		Control Group		Total	
	n	%	n	%	n	%
Gender						
Male	390	53.50	256	55.53	646	54.29
Female	329	45.13	198	42.95	527	44.29
Diverse	10	1.37	7	1.52	17	1.43
Language spoken at home						
Only German	326	44.72	170	36.88	496	41.68
(Also) other languages than German	403	55.28	291	63.12	694	58.32
School type						
Lower secondary school (Hauptschule)	131	17.97	84	18.22	215	18.7
Intermediate secondary school (Realschule)	58	7.96	195	42.30	253	21.26
Comprehensive school (Gesamtschule)	540	74.07	182	39.48	722	60.67
School grade level						
9^{th} grade	525	72.02	439	95.23	964	81.01
10^{th} grade	204	27.98	22	4.77	226	18.99
Parents' highest degree						
No occupational degree	35	4.80	26	5.64	61	5.13
At least one parent with VET degree	293	40.19	184	39.91	477	40.08
At least one parent with academic degree	146	20.3	82	17.79	228	19.16
Both parents with academic degree	67	9.19	26	6.64	93	7.82
Non-response/don't know/invalid response	188	25.79	143	31.02	331	27.82
Total	729		461		1190	

all social context variables in a joint model, which allows us to compare the relative contribution of each social context characteristic. All continuous variables were z-standardised.

3.4.3. Pre/Post Analyses (t_1, t_3)

To assess the intervention effect (RQ2; Figure 2), we compared the observed pre/post change in the treatment group with the change we observed in the control group used as a counterfactual. The difference in the changes between treatment and control group corresponds to the average treatment effect on the treated (ATT; see Shadish et al., 2002). First, we identified the ATT with a random intercept fixed slope multilevel model of students' occupational aspirations on the treatment indicator. Technically, this model comprises a cross-level interaction term between treatment assignment (level 3) and the wave (t_1 or t_3; level 1). Control variables were included to account for baseline differences between treatment and control group. Second, to investigate whether the treatment effect varies by different social context characteristics (RQ3; Figure 2), we introduced a three-way interaction with the relevant social context variable (i.e., interacting treatment status with the wave and the social context variable).

4. Results

4.1. Descriptives

The average occupation-specific aspiration across all surveyed occupations was M = 1.825 (SD = 0.955) for the treatment group, which was statistically significantly lower than the average occupation-specific aspiration of the control group with M = 1.945 (SD = 0.971) (t[2010] = 2.779, p = 0.006). On the scale ranging from 1 to 5, this indicates that the average occupational aspiration was rather low, with a strong positively skewed distribution and an interquartile range from 1 to 2.5 due to a bulk of responses at the lower end of the scale (see Figure A1 in the Supplementary File). For further analyses, the outcome variable was z-standardised to assess the impact of predictor variables in terms of standard deviations from the mean value.

4.2. How Are Social Contexts Associated With Occupational Aspirations at Baseline (t_1)?

Table 2 shows the multilevel model exploring the impact of each social context characteristic on students' occupation-specific aspirations at t_1 while considering individual control variables. Peers' occupation-specific

Table 2. Baseline model examining the association of social context characteristics and occupational aspirations.

Peer context	*b*
Occupation-specific aspiration	0.265***
Occupation-specific knowledge	–0.071***
Occupation-specific self-efficacy	–0.117***
Expected social valuation of the occupation	0.112**
Parent context	***b***
Expected social valuation of the occupation	0.198***
Highest degree (Ref. Both parents with academic degree)	
No occupational degree	0.046
At least one parent with VET degree	< –0.001
At least one parent with academic degree	< –0.001
Non-response	0.091
Control variables	***b***
Gender (Ref. male)	
Female	–0.065
Diverse	–0.173
Language spoken at home: (also) other languages than German	0.170***
School type (Ref. lower secondary)	
Intermediate secondary	–0.028
Comprehensive	–0.044
School grade level (10th grade, ref. 9th grade)	–0.017
Individual occupation-specific knowledge	0.230***
Individual occupation-specific self-efficacy	0.329***
Listed general occupational aspirations (yes)	–0.160***

Notes: * $p < .05$; ** $p < .01$; *** $p < .001$; n = 2,012; the coefficients for the presented occupations are not presented in this table.

aspiration for the presented occupations and both peers' and parents' expected social valuation of these occupations were statistically significant predictors of students' occupation-specific aspirations. Thus, the influence of descriptive norms by peers (H1a) and injunctive norms by peers (H1b) and parents (H2b) was supported by our findings, with the descriptive normative peer influence (peers' occupation-specific aspiration) being the strongest predictor in the model followed by the injunctive normative parental influence (parents' expected social valuation). When the occupation-specific aspiration among classmates increased by one standard deviation, the model predicted that individual students' aspirations for this occupation increased by .265 standard deviations. Peers' occupation-specific knowledge and peers' occupation-specific self-efficacy also had a statistically significant impact and were negatively associated with the student's aspiration for the presented occupation under consideration of all other social context characteristics. Thus, H1c expecting a positive association with informational peer effects was rejected and H1d expecting a negative association with comparative peer effects was supported: When peers' occupation-specific self-efficacy increased by one standard deviation, the model predicted that the individual students' occupation-specific aspiration decreased by −0.117 standard deviations. The parents' highest degree appeared to have no impact on students' occupation-specific aspirations. Thus, the influence of descriptive norms by parents (H2a) was not supported by our findings. The impacts of peer and parent social context characteristics are visualised in Figure 4.

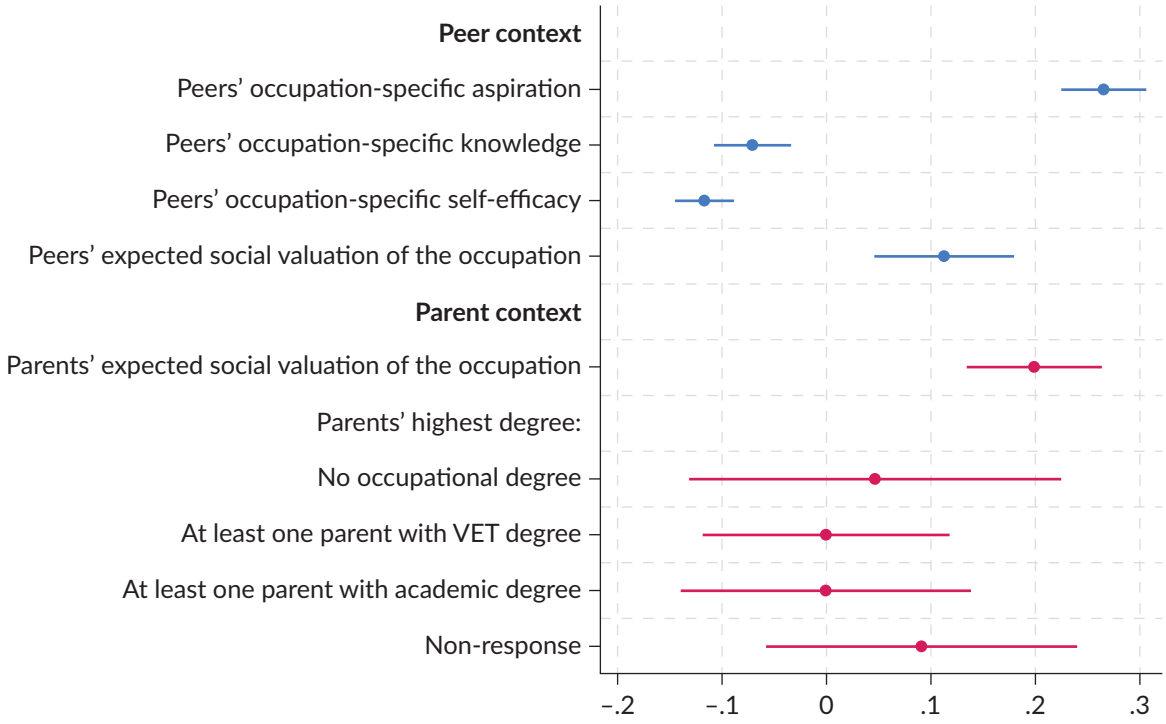

Figure 4. Illustration of the impacts of social context characteristics on occupational aspirations at baseline.

4.3. What is the Effect of Vocational Role Models on Occupational Aspirations?

Against the background of the associations outlined above, we examined whether vocational role models affect students' occupational aspirations for the occupations presented by VET ambassadors while controlling for peer and parent context characteristics. The model yields a statistically significant interaction

term ($p < 0.001$) between the wave and the treatment status, indicating that the treatment and control groups significantly differ in their pre-post changes. Figure 5 shows that the average pre-post change in aspirations is close to zero for the control group (0.004 SD) and positive for the treatment group (0.151 SD). This corresponds to an ATT of 0.148 standard deviations (corresponding to 0.141 scale points). Participating in the role model intervention is therefore associated with an average increase in aspirations for the presented occupation, thus supporting H3.

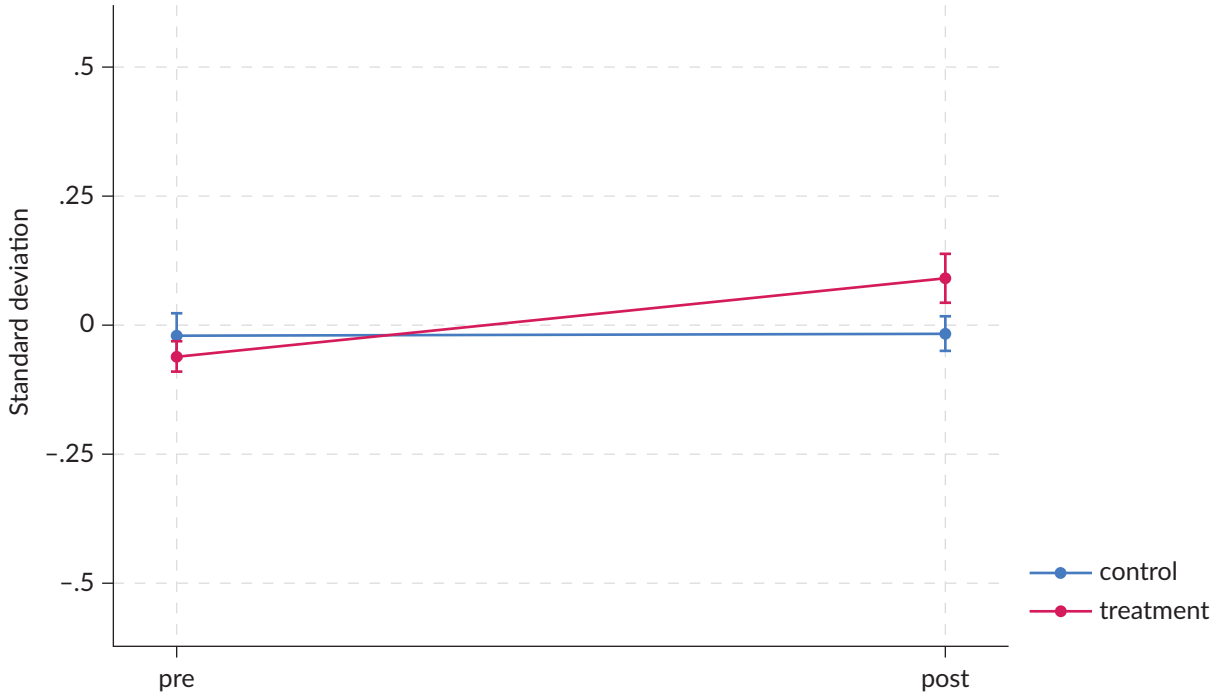

Figure 5. Pre/post changes in occupation-specific aspirations and treatment effect

4.4. Do Vocational Role Model Effects Vary by Students' Embeddedness in Different Social Contexts?

To assess whether the ATT differed by students' social embeddedness, we first inspected the three-way interaction terms between treatment status, wave, and the different peer and parent social contexts, as displayed in Table 3. None of the interaction terms reach statistical significance, suggesting that differences in the treatment effect between the examined social contexts cannot be precisely estimated (potentially also due to lower statistical power for the upper and lower ends in the distribution). Taking this into account, we next inspected the substantive meaning of the effect sizes as recommended by Bernardi et al. (2016). Figures 6 and 7 display the predicted ATT along the distribution of the peer and parent social context variables in standardised units. Some noteworthy patterns emerge. First, regarding the peer contexts in Figure 6, we find three negative associations between the context characteristic and the size of the treatment effect. Treatment effects are larger in size when peers' aspirations for the presented occupation are less pronounced, when peers' occupation-specific knowledge is relatively low, and (to a smaller extent) when peers' expected social valuation of the occupation is lower. For example, when classmates express an average occupation-specific aspiration of two standard deviations below the mean, the treatment effect is approximately 0.20 standard deviations, whereas, for classroom contexts characterised by strong aspirations for the respective occupation of two standard deviations above the mean, the treatment effect is rather

small with approximately 0.04 standard deviations. This finding is contrary to H4a, expecting a positive association for descriptive and injunctive peer norms. With regards to parental descriptive and injunctive norms (Figure 7), no particular patterns emerge, therefore not supporting H4a either. The negative association pattern regarding peers' occupation-specific knowledge in Figure 6 supports H4b; however, it does not have statistical significance. A positive association is visible for peers' occupation-specific self-efficacy such that a lower self-efficacy expressed by classmates is associated with a smaller treatment effect (of approximately 0.09 SD when the classmates' occupation-specific self-efficacy is 2 SD below the mean) and classrooms characterised by a high degree of self-efficacy (i.e., 2 SD above the mean) are associated with a larger treatment effect of approximately 0.19 standard deviations. This was contrary to the expectations from H4c concerning comparative social peer influence.

Table 3. Effect heterogeneities in the intervention effect by different social context characteristics.

	Three-way interaction: Pre/post #treatment #social context variable
Peer context	*b*
Occupation-specific aspiration	–0.041
Occupation-specific knowledge	–0.042
Occupation-specific self-efficacy	0.022
Expected social valuation of the occupation	–0.030
Parent context	*b*
Expected social valuation of the occupation	0.011
Highest degree (Ref. Both parents with academic degree)	
No occupational degree	0.338
At least one parent with VET degree	0.276
At least one parent with academic degree	0.083
Non-response	0.207

Notes: * $p < .05$.

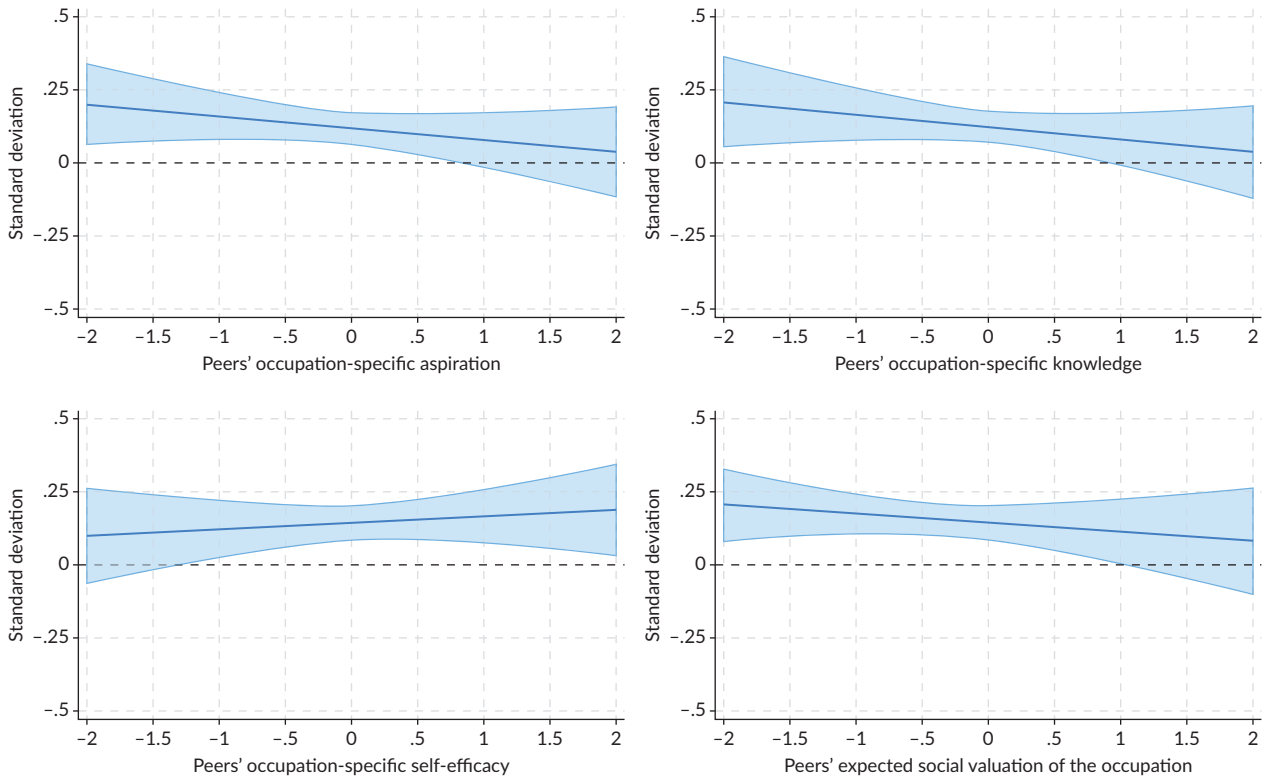

Figure 6. Intervention effects by peer social context characteristics. Notes: Based on regression results displayed in Table 3; the x-axis refers to the peer context in terms of standard deviations below/above the mean denoted as 0.

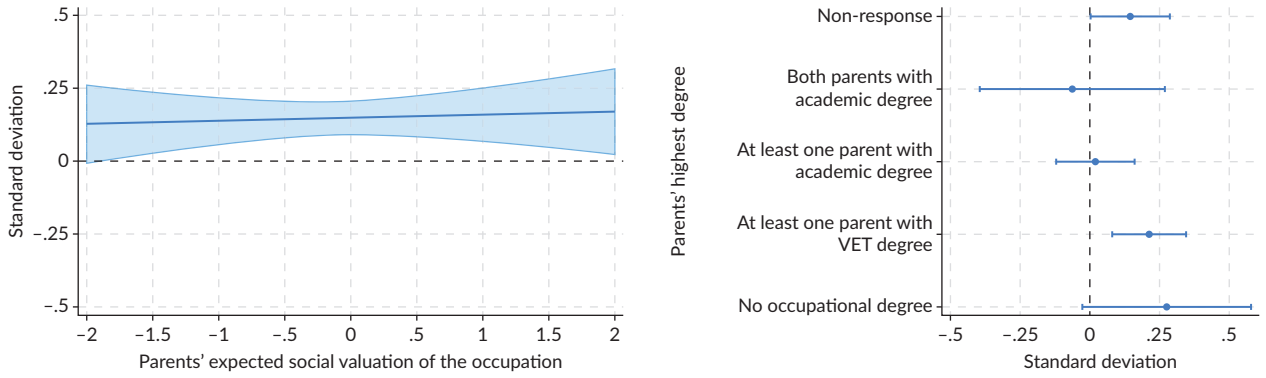

Figure 7. Intervention effects by parental social context characteristics. Notes: Based on regression results displayed in Table 3; the x-axis refers to the parent context in terms of standard deviations below/above the mean denoted as 0.

5. Discussion

The results of our quasi-experimental study explored short-term social influence effects from vocational role models as well as long-term social influences from social context characteristics for students' career orientation processes, and the interrelation of both. Using students' occupational aspirations as outcome variable, we addressed an important developmental outcome in students' career orientation processes

related to after-school pathways and career choices, which is highly relevant for successful school-to-work transitions (Schoon & Parsons, 2002; Sewell et al., 1969).

Overall, our findings resonate with previous studies showing a strong link between different social context characteristics and occupational aspirations (e.g., Cialdini & Goldstein, 2004; Fischer-Browne, 2022; Raabe & Wölfer, 2019; Zimmermann, 2020) in terms of injunctive social norms by parents and peers and descriptive social norms for peers among a regional sample of secondary school students in Germany. Unexpectedly, parents' highest degree as a descriptive normative influence was not statistically significantly associated with students' aspirations for the presented VET occupations (for possible reasons see Section 6). Importantly, we simultaneously assessed different key dimensions of social peer contexts (i.e., normative, informational, and comparative) that have previously remained unconnected in separate strands of literature. Our results point to the distinct importance of each of these contexts, with descriptive peer norms being most relevant in comparison to the other examined social context characteristics.

In view of the relevance of social contexts shown in the baseline model, our results indicate that vocational role models statistically significantly increase students' aspirations for the presented VET occupations. This suggests that short-term social influences can have an impact on students' occupational aspirations despite significant long-term influences by parents and peers in the career orientation process. The effect size of the intervention may be rather small; however, based on career development theories that highlight the complexities and multifaceted influences of career choices (e.g., Yates, 2021), it cannot be expected that interventions involving meeting vocational role models in class increase every student's aspiration for the presented occupation. Further, considering the skewed distribution of the outcome variable towards low aspirations for the presented occupations overall, 0.141 points on the original 5-point scale are notable. This finding is in line with happenstance learning theory (Krumboltz, 2009; Mitchell et al., 1999), which emphasises the power single events can have on career choices. One of the major strengths of our study is the quasi-experimental research design that allows a causal interpretation of this result linked to the direct effect of vocational role models in schools. This evidence suggests that vocational role models can be a useful asset for the policy goal of strengthening the attractiveness of VET in Germany by enlarging students' aspirations for certain VET occupations. Nevertheless, future research should assess whether role model effects remain relevant for students' long-term pathways, unfolding over a longer period.

Another strength of our study is the exploration of possible effect heterogeneities of the vocational role model intervention in terms of social contexts, a theoretical expectation based on situational decision-making models, which has not previously been examined empirically. We found that the vocational role model intervention is mostly unrelated to students' embeddedness in different social contexts. Therefore, this finding supports the practice of vocational role models as a useful and widely applicable career orientation activity in schools. Nonetheless, a closer examination of the effect heterogeneities in substantial terms revealed some noteworthy patterns, suggesting some tendencies of higher effectiveness in certain social contexts.

First, the intervention appeared to increase the occupation-specific aspirations more strongly when peers in the classroom aspired to the occupation less and when lower social valuation by peers was expected for this occupation. This was an unexpected and surprising result contrary to hypothesis H4a, expecting a positive relationship between the peers' occupation-specific aspiration and a stronger treatment effect in that case,

due to individuals seeking conformity with their peer group (Cialdini & Goldstein, 2004; Laursen & Veenstra, 2021). Despite this finding being theoretically unexpected, it highlights the potential of the vocational role model intervention to increase aspirations for less popular occupations among students. A possible alternative explanation for this unexpected pattern could be derived from the MFS (Esser, 1999; Kroneberg, 2005, 2010, 2014). Since the VET-ambassadors typically presented their occupations in a rather positive and engaging manner, they may have offered new information, viewpoints, and motivation to previously less aspired and less valued VET occupations. Therefore, students may have crossed the threshold of not acting according to the as-mode but entering the rc-mode due to shifted social norms perceived for this occupation through the role model. Consequently, students would re-assess the subjective expected utility of aspiring to the specific occupation (Kroneberg, 2014). Perhaps the role model would also reduce the expected social costs of aspiring to a previously unfavoured occupation by delivering a positive image. This could have resulted in a higher increase of aspirations for those less favoured VET occupations and, thus, in a higher ATT. By contrast, for highly aspired and socially valued VET occupations, the information and positive portrayal delivered by the vocational role model would match students' preconceptions and, therefore, they might follow the as-mode and not question their decision-making process regarding their aspirations for these occupations. Accordingly, the intervention has less impact and does not increase the occupation-specific aspirations in that case.

Second, the analysis of effect heterogeneities showed a statistically insignificant but noteworthy pattern in terms of the peers' occupation-specific knowledge and peers' occupation-specific self-efficacy. In line with our hypothesis H4b, the intervention appeared to increase the aspiration for the presented VET occupation more strongly when classmates were less informed about this occupation. Contrary to our hypothesis H4c regarding occupation-specific self-efficacy, the intervention appeared to increase the students' aspiration for the presented VET occupation more strongly when peers in the classroom showed higher self-efficacy for this occupation. A possible explanation for this could be that vocational role models empower students interested in the specific occupation but who might be reluctant to aspire to this occupation because their classmates show great self-efficacy for this occupation. This suggests that vocational role model interventions might empower students to overcome the big-fish-little-pond effect (Marsh, 1987), perhaps by showing what is possible and how to achieve it (Morgenroth et al., 2015). In light of career orientation activities at school, empowering students to follow their occupational interests less influenced by their peers' self-efficacy would be an additional major strength of vocational role models.

6. Limitations

Regarding the social contexts that we addressed with this study, three shortcomings should be noted. First, we found no statistically significant differences in students' occupation-specific aspirations (t_1) and in the treatment effect (t_3) by parents' highest degree. Potentially, parents' occupations could be more important in structuring students' career orientation process than their parents' general educational level and occupational degree. Future research investigating occupational role models could thus consider how treatment effects vary by parents' occupations.

Second, regarding the different peer context characteristics, it should be noted that despite controlling for students' gender, future research should additionally investigate gender influences in more detail, which is relevant for career choice processes (e.g., Ridgeway, 2011) and a relevant line of demarcation in social influence processes. For example, friendship groups are strongly segregated by gender (e.g., McPherson et al., 2001)

and peer influence happens along gender lines (e.g., Thijs et al., 2010). Therefore, exploring gender-specific role-modelling effects could provide further insights.

Third, we used a common way of measuring peer norms as part of the overall classroom climate (e.g., Mackie & Moneti, 2015) by operationalising social norms as aggregate variables. However, another aspect of peer norms involves their salience, i.e., whether norms are considered relevant by the individual in order to influence their behaviour (see Cialdini & Goldstein, 2004). Therefore, future research should consider norm salience, for example, by depicting social network structures and friendship networks within classrooms.

Lastly, the overall study design should be considered when interpreting our results. Our results are based on a non-representative regional sample of secondary schools in Germany. The study sample is marked by a specific cohort that was surveyed during and at the end of the Covid-19 pandemic, when students spent more time than usual in family contexts rather than in school. Hence, intervention effects and social context effects could be different for other student cohorts.

7. Conclusion

The finding that role models increase students' occupational aspirations for the presented VET occupation irrespective of peer and parent social contexts in which students are embedded substantiates the great potential of vocational role modelling as a career orientation approach. It appears that these long-term social contexts do not hinder students from incorporating their short-term experiences with role models into their formation of occupational aspirations. Although effect sizes were small, this finding lends support to the practical relevance of short-term career activities such as role modelling interventions in the German school system. Regarding the policy implications of our findings, vocational role models could hence be implemented in a more targeted manner to increase the visibility and attractiveness of specific VET occupations that suffer, for example, from a lack of workforce. Moreover, our findings suggest that the role model intervention effect might be larger for previously less aspired occupations in particular.

It should be noted, however, that increasing aspirations for specific occupations does not necessarily imply that these occupations will always be a fitting career choice for students, as young people navigate a range of individual and environmental factors and resources in their career orientation. Hence, when implementing role models to promote VET occupations, policymakers and stakeholders should consider presenting a variety of occupations with different role models to show the diversity of the world of work and the variety of people in those occupations, thereby painting a realistic and authentic picture of different career options.

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Conflict of Interests

The authors declare no conflict of interest. In this article, editorial decisions were undertaken by Ulf Hedetoft (University of Copenhagen, Denmark).

Data Availability

The collected primary data associated with this article is currently not available to the public. All respondents and the participating schools gave their informed consent prior to their participation in the research, and adequate steps were taken to protect participants' confidentiality. The data collection and data management approach was approved by the data protection officer of the BIBB.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

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