

Helping parents support adolescents' career orientation: Effects of a parent-based utility-value intervention

Heide Piesch · Isabelle Häfner · Hanna Gaspard · Barbara Flunger · Benjamin Nagengast · Judith M. Harackiewicz

Published online: 27 August 2018

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Abstract Adolescents' motivation is crucial for their transition from school to further education. Parents are known to have a substantial influence on their children's motivational beliefs through their own beliefs and behaviors. In this study, we tested whether a parent-based utility-value intervention could promote parents' and students' motivational beliefs and career orientation behavior. Twenty eighth-grade classrooms from German middle-track schools were randomly assigned to the intervention or to a waitlist control condition. Data from 357 students and their parents were obtained via separate questionnaires at pretest and posttest. The intervention was operationalized through a website where parents and students could find information about the usefulness of different school subjects for future careers. The website was designed to help parents support their children during the career orientation process. To examine the effects of the intervention on parents' and students' motivational beliefs and career orientation behavior, Intention-to-treat and Complier Average Causal Effect analyses were calculated. The results showed negative intervention effects on parental career support and perceived importance of career support. No intervention effects were found on the other parental outcomes or on student outcomes. We discuss reasons for these results. The study shows that intervention material needs to be carefully designed and implemented.

Electronic supplementary material The online version of this article (<https://doi.org/10.1007/s42010-018-0024-x>) contains supplementary material, which is available to authorized users.

H. Piesch (✉) · I. Häfner · H. Gaspard · B. Nagengast
Hector Research Institute of Education Sciences and Psychology, University of Tübingen,
Europastr. 6, 72072 Tübingen, Germany
E-Mail: heide.piesch@uni-tuebingen.de

B. Flunger
Utrecht University, Heidelberglaan 1, 3584 CS Utrecht, The Netherlands

J. M. Harackiewicz
University of Wisconsin-Madison, 1202 W Johnson Street, Madison, WI 53706, USA

Keywords Motivation · Intervention · Parents · Career orientation · Expectancy-value

Realschule und dann? Effekte einer Nützlichkeitsintervention zur Unterstützung von Eltern und Jugendlichen bei der Berufsorientierung

Zusammenfassung Die Lernmotivation hängt eng mit beruflichen Entscheidungen am Übergang von der Schule in die weitere Ausbildung zusammen. Eltern können die motivationalen Überzeugungen ihrer Kinder durch ihre eigenen Überzeugungen und ihr Verhalten in hohem Maße beeinflussen. In der vorliegenden Studie wurde untersucht, ob eine elternbasierte Nützlichkeitsintervention die Berufsorientierung und die motivationalen Überzeugungen von Eltern und Jugendlichen fördern kann. In einem experimentellen Prätest-Posttest-Design wurden 20 Realschul-Klassen mit insgesamt 357 Schülerinnen und Schülern der 8. Jahrgangsstufe zufällig der Interventions- oder Warte-Kontrollgruppe zugewiesen. Die Intervention wurde mithilfe einer Webseite umgesetzt, die Informationen zur Nützlichkeit von mehreren Schulfächern für verschiedenen Berufe enthielt. Die Webseite sollte Eltern darin unterstützen, ihren Kindern bei der Berufsorientierung zu helfen. Die Interventionseffekte auf die Motivation und die Berufsorientierung von Jugendlichen und Eltern wurden mithilfe von Intention-to-treat- sowie Complier Average Causal Effect-Analysen untersucht. Es zeigten sich negative Interventionseffekte auf die elterliche Unterstützung bei der Berufsorientierung sowie auf deren wahrgenommene Wichtigkeit. Für weitere elterlichen Variablen sowie auf Seiten der Schülerinnen und Schüler fanden sich keine Interventionseffekte. Mögliche Gründe für die fehlenden bzw. unerwarteten Effekte werden diskutiert. Die Ergebnisse verdeutlichen, dass Nützlichkeitsinterventionen sorgfältig entwickelt und implementiert werden sollten.

Schlüsselwörter Motivation · Nützlichkeitsintervention · Eltern · Berufsorientierung · Erwartungs-Wert-Theorie

1 Introduction

The transition from school to vocational education is often a crucial period in adolescents' lives. They are faced with decisions and choices that can substantially impact their future (for a review, see Dietrich et al. 2012). Thus, preparing for this transition is an important task for adolescents and socializers. Previous research has indicated that parents can play an essential role in their children's career decision process (Jodl et al. 2001; Noack et al. 2010). Adolescents listed their parents as important supporters of career-related decisions when asked about potential sources of support in their transition process (Tynkkynen et al. 2010). Providing parents with assistance and information about career-related topics appears to be a promising way to help adolescents make these important choices.

Harackiewicz et al. (2012) developed a parent-based intervention that was aimed at supporting parents and students in their career preparation. The intervention focused on parents' and students' value beliefs in math and the sciences by providing

parents with information about the importance of these subjects for their children's future careers. This intervention promoted students' course taking and motivation in math and the sciences and had long-term indirect effects on career goals and course-taking at university (Rozeek et al. 2017).

Relying on Harackiewicz et al.'s (2012) results, in the present study, we examined whether a similar parent-based utility-value intervention could help parents and students place more value on school subjects and support students' career orientation process. The intervention was based on expectancy-value theory (Eccles et al. 1983) and focused on the value students attach to different school subjects, which in turn influences their later educational choices (Eccles 2005). We expected the intervention to promote parents' and students' value beliefs and foster their communication about students' career plans, which, in turn, can have a positive impact on their career orientation process.

First, we wanted to conceptually replicate the findings of the abovementioned parent-based intervention study (Harackiewicz et al. 2012) by investigating the generalizability of such intervention effects in a different setting, that is, in German middle-track schools. In this setting, the transition from school to job occurs at an earlier age, and the intervention was thus aimed at helping adolescents prepare for this transition. Second, our study was aimed at extending the intervention from focusing only on school subjects to focusing on transitions from school to vocational education. We examined intervention effects on many outcomes, including parents' and students' value beliefs about different domains, parents' career-supporting behavior, and students' career orientation behavior. Here, we especially considered students' active engagement in career exploration and career decision processes, which are important prerequisites for a successful transition (Noack et al. 2010; Savickas 2002).

2 Theoretical background

2.1 Expectancy-value theory

A common framework for explaining students' achievement motivation is Eccles' expectancy-value theory (EVT; Eccles et al. 1983). According to EVT, students' expectancy of success in a specific task and their task value (i.e., their reasons for engaging in the task) predict their achievement-related behaviors and choices (e.g., career aspirations and decisions; Eccles and Wigfield 2002). Eccles (2005) proposed four value components: intrinsic value (enjoyment of a task), attainment value (the importance one attaches to the task), utility value (the usefulness of the task for one's life or future), and cost (negative emotions or effort required when doing the task). Many studies have shown that expectancy and value beliefs have a substantial impact on achievement-related behaviors and on course and career choices (Simpkins et al. 2006; for a review, see Wigfield et al. 2016). Subject- and school-related utility value may be especially important for students' career aspirations, given that utility information highlights how specific subjects can facilitate the achievement of future goals (Battle and Wigfield 2003). Thus, we developed an intervention based on EVT

emphasizing the value of different school subjects for the transition from school to work. Our intervention targets both value beliefs and career orientation behavior, both of which are important for this transition. Moreover, it focuses on parents as they can have a substantial influence on their children's value beliefs and career choices.

2.2 The role of parental beliefs and behavior in students' motivation and career orientation

Parents' expectations and beliefs can shape their children's motivation, achievement, and career orientation through multiple ways of involvement (Eccles 2005; Häfner et al. 2017; Jodl et al. 2001). For example, parents express their expectations and values when they communicate with their children about school and future careers (Jodl et al. 2001). However, previous research has shown that not only the amount and frequency (i.e., the quantity) of parental involvement are important for students' academic and career outcomes but also the quality (Grolnick et al. 2009). More specifically, too much parental involvement can even have negative effects on students' motivation: Older students in particular might feel controlled and not supported in their autonomy, which in turn can even undermine their intrinsic motivation (Pomerantz et al. 2005). Self-determination theory (Ryan and Deci 2000) postulates that parental involvement supporting children's need for autonomy is important for their motivation, personal growth and social development, which has been supported by many empirical studies (Fan and Chen 2001; Grolnick et al. 2009). With regard to their career orientation, adolescents consider their parents' autonomy supportive behavior to promote their career orientation process (Phillips et al. 2002). Accordingly, autonomy supportive behavior seems to be particularly important during transitions (e.g., the transition from school to work; Grolnick et al. 2000) as adolescents could benefit from the autonomy to develop their own ideas about their future career (i.e., career autonomy). Thus, intervening in the context of parental autonomy supportive behavior and beliefs could help students develop and maintain motivation and engage in career orientation behavior.

2.3 Student- and parent-based utility-value interventions

Given the great influence students' and parents' beliefs can have on adolescents' achievement and career orientation processes, researchers have developed and implemented interventions to promote students' and parents' beliefs (for a review, see Lazowski and Hulleman 2016). The approaches that were based on EVT typically address subject-specific motivational beliefs and focus on the utility value component. In contrast to intrinsic and attainment value, utility value, as a more extrinsic part of motivational beliefs (Eccles and Wigfield 2002), can be influenced more easily from the outside. These interventions are designed to help students perceive academic subjects as relevant to their own lives. They typically involve tasks in which students reflect on and generate examples of the personal usefulness of the subject for their own future (Hulleman and Harackiewicz 2009). Another effective way to promote perceived utility value is to present quotations of former

students about the usefulness of the subject in question (Brisson et al. 2017; Gaspard et al. 2015a; Harackiewicz et al. 2012). Such interventions have been successful at enhancing students' utility value beliefs, self-concept, effort, and achievement in different school subjects (Brisson et al. 2017; Gaspard et al. 2015a; Hulleman and Harackiewicz 2009; for reviews, see Lazowski and Hulleman 2016; Rosenzweig and Wigfield 2016).

In recent years, researchers have investigated whether interventions that target parents can also promote students' value beliefs. In a randomized field trial with ninth-grade students that was part of a longitudinal study (Wisconsin Study of Families and Work; for more details, see Hyde et al. 1995), Harackiewicz et al. (2012) tested a parent-based intervention for promoting parents' and students' value beliefs about STEM subjects (science, technology, engineering, and math). Parents were provided with information about possible STEM careers for their children and the usefulness of math and science for these careers. The researchers found that parents showed higher utility value beliefs about STEM courses for their children after the intervention. Furthermore, students took more STEM courses, and this in turn was associated with students' STEM beliefs and career aspirations five years later (Harackiewicz et al. 2012; Rozek et al. 2017). Later analyses of Rozek et al. (2015) revealed, though, that the success of the intervention depended on previous achievement and gender and that low-achieving girls even seemed to experience negative intervention effects.

Harackiewicz et al.'s (2012) study showed the potential of parent-based utility-value interventions. However, they examined only a small number of parent behaviors and beliefs. Specifically, students' subsequent career orientation behavior (e.g., exploration of career options) might have been impacted as well because it was addressed in the intervention material.

2.4 Students' and parents' career orientation behavior

In their career orientation process, youths need to investigate their own interests and expectations concerning their future careers as well as job characteristics and labor market conditions (Noack et al. 2010). This information-gathering process is known as career exploration, which is an important prerequisite for the actual transition (Noack et al. 2010; Savickas 2002) and a satisfactory career choice (Kracke 1997). It requires a long-term orientation process that begins during the last years of school (Kracke 1997) and usually increases as the transition approaches.

Other constructs that are relevant for adolescents' career orientation include the importance they attach to engaging in their career decision (Kaak et al. 2013) and their career decidedness, which refers to adolescents' ability and preparedness for choosing a specific occupation (Super and Kidd 1979). Hirschi and Läge (2008) showed that students with higher career decidedness felt less stressed about their career decision-making, were more actively engaged in applying for an apprenticeship, and were more successful in finding one.

There is evidence that parental career support and promotion of career exploration are positively associated with children's career exploration (Dietrich and Kracke 2009; Kracke 1997). Child-centered parenting that includes support and recipro-

cal communication is supposed to foster adolescents' maturity and self-initiative (Kracke 2002), both of which are important aspects of career orientation behavior. Kracke and Schmitt-Rodermund (2001) found that parental openness and supportive behavior concerning their children's ideas positively predicted children's career exploration. Teaching parents how to support their children's career orientation and how to interact with their children can therefore be a promising way to support adolescents' career orientation process.

3 The present study

In a cluster-randomized study, we evaluated the effects of a parent-based utility-value intervention on parents and students. Our aim was to replicate Harackiewicz et al.'s (2012) parent intervention study on a conceptual level and to expand it by investigating the effects on parents' and students' career orientation. As previous parent-based utility-value intervention studies have been conducted in only the U. S. school system, we adapted Harackiewicz et al.'s intervention to the German educational system and specifically to a sample of eighth-grade students from middle-track schools. These students usually graduate after 10th grade and afterwards choose either to attend a vocationally oriented academic track school or to begin a vocational training. We chose to intervene in this specific context because these students have to make their first career-related decision in the immediate future. During their final school years, students normally intensify their occupational preparation and discuss career-related issues at school. However, many students have trouble making a decision that will match their individual interests and abilities (Oechsle et al. 2009).

The intervention was implemented via a website that contained information for parents and students about the usefulness of school and different careers options. In the intervention material, we addressed math, German, and English as the main subjects that play roles in the transition from school to job. Similar to Harackiewicz et al. (2012), we also guided parents in how to successfully communicate with their children. In addition, we placed emphasis on a detailed assessment of students' and parents' career orientation behavior that involved various scales and the perspectives of both students and parents. Thus, we tried to transfer Harackiewicz et al.'s (2012) results, which showed surprisingly promising effects of a simple intervention, to the context of motivation for the transition from school to vocational education.

We propose a working model of our study illustrating the mechanisms through which the intervention was assumed to influence the outcomes (Fig. 1). The first part of the intervention, the utility information about different subjects and information about careers, was hypothesized to promote parents' and students' utility value beliefs concerning the different subjects. The other part, the communication support for parents, was hypothesized to foster and support interactions between parents and their children about the usefulness of school and about career-related topics. We expected both parts of the intervention to promote students' engagement in their career orientation. By providing information about different careers and about the utility of different subjects for these careers, we sought to encourage students to reflect on possible careers and the perceived utility of school. Additionally, we

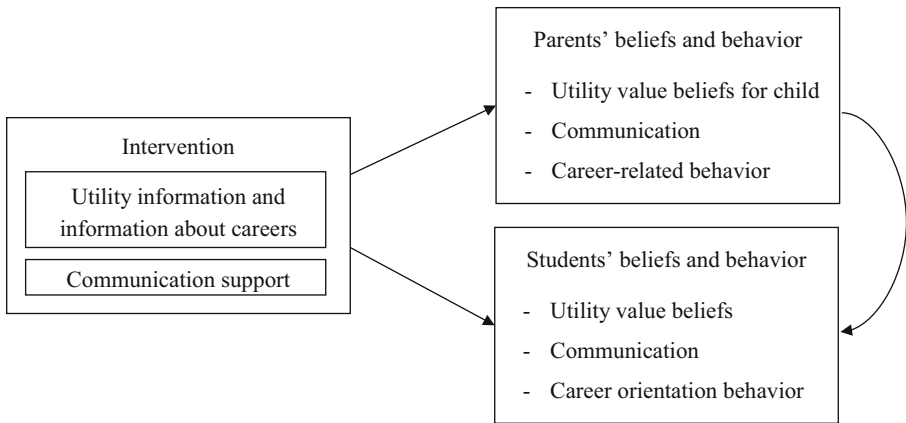


Fig. 1 Theoretical model illustrating how the intervention components are supposed to affect parent and student variables

expected parents to convey their value beliefs to their children and to support them within their career orientation by jointly reflecting about the usefulness of school and about possible career paths. We paid special attention to how we advised parents to support their children by emphasizing the importance of autonomy.

Our specific research questions were as follows: First, can parents' and students' utility value beliefs be promoted through the intervention? We hypothesized that the intervention would increase parents' utility value beliefs regarding their children as well as students' utility value beliefs in the targeted subjects. Second, can the intervention affect parents' career supportive behaviors and beliefs (i.e., school and career communication, career autonomy, career support, and importance of career support)? We expected that parents would show more career supportive behavior and communication with their children after the intervention because parents were taught how to communicate with their children. Third, can the intervention affect students' career orientation behavior (i.e., career decision, career exploration, and career involvement) and discussions with their parents about career-related issues? Again, we expected to find an increase in students' engagement in career orientation behavior and in their communication with their parents.

4 Method

4.1 Sample and procedure

Our sample consisted of 20 classes of eighth graders from seven middle-track schools (one to five classes per school) in the German state of Baden-Württemberg. Overall, 357 students participated (51.5% female; age at pretest: $M = 14.11$). Participation was voluntary, and students and parents had to give written consent to participate. Parents of 326 families (91.3%) filled out at least one questionnaire at pretest or posttest. Regarding family background, 23.8% of mothers and 31.4% of fathers held

qualifications for college education (Abitur). As for immigration status, one parent was born outside of Germany in 12.5% of the families, and both parents were born outside of Germany in 18.6% of them (predominantly in Turkey). Before the pretest, classes were randomly assigned to the intervention or control condition within each school. Thus, there were 10 classes in each condition ($n_{\text{intervention}} = 169$, $n_{\text{control}} = 188$). Data collection took place before the intervention in February 2016 (pretest=T1) and approximately six weeks later in March 2016 (posttest=T2). Trained research assistants administered the questionnaires to the students and handed out envelopes containing the parent questionnaires, which parents were requested to fill out at home.

4.2 Intervention

Two weeks after the pretest, we sent letters to the parents in the intervention classes containing a link to the password-protected website and a personal login code. The letter invited parents to explore the website on their own or along with their child. The original website is available at www.realschule-und-dann.de. An outline of the topics presented on the website can be found in Appendix A. We presented information for parents and students about the usefulness of math, German, and English for specific vocational trainings and careers as well as for students' daily lives and futures in general. Drawing on previous intervention studies (Gaspard et al. 2015a; Harackiewicz et al. 2012), we used quotations of former students and adults who talked about how they had applied what they learned in the abovementioned subjects to their job or daily life. To help parents and students reflect on possible connections from school to future jobs, we included examples and small communication tasks. Moreover, the website included information about possible future careers in several areas that were typical for graduates of middle-track schools. We also presented research results on the roles that students' effort and self-concept play for school achievement in order to counteract any potential negative intervention effects for students who might not feel competent in the targeted subjects (Durik et al. 2014). In addition, we included an online questionnaire in which parents could evaluate the website and provide feedback. Because we used a waitlist control group design, we opened the website to the public after we administered the posttest and invited the participants in the control condition to visit the website as well.

4.3 Compliance measure

Although we invited all families in the intervention classes to visit our website, these visits were voluntary. To assess whether participants in the intervention condition were compliant with our intervention (i. e., whether they actually visited the website), we asked parents and students at posttest whether they looked at the website. We asked parents this question in the online questionnaire, too. In addition, we tried to track the website logins to get information about families' frequency and duration of visits, but this was possible for only a small proportion of our sample (seven families) due to computer safety settings. However, the data we were able to track were consistent with the data we received through the questionnaires.

Table 1 Descriptive Statistics for Compliance Status in the Intervention Condition

	Visited website		Did not visit website		Missing	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Students	92	54.4	62	36.7	15	8.9
Parents	92	54.4	29	17.2	48	28.4
Students and parents	79	46.7	38	22.5	52	30.8
Students and/or parents	105	62.1	49	29.0	15	8.9

N = 169

The descriptive statistics for compliance status (i.e., a measure of the website visits) are displayed in Table 1. In 62.1% of the families in the intervention condition, the student, the parent, or both visited the website. By contrast, 29.0% reported that they did not visit the website, and we received no clear information about the website visits of 8.9% of the participating families. To form the compliance measure, we combined the student and parent measures from all data sources (student and parent questionnaires, online questionnaire) into one compliance measure per family. The family was coded as compliant if either the child or the parent or both reported that they had visited the website at least once. If the child and the parent stated that they did not visit the website, the family was coded as noncompliant. In addition, if one person (e.g., the child) reported that he or she did not take a look at the website and the other person (the parent) did not answer the question, the compliance measure was coded as noncompliant. The families that did not report whether they visited the website as well as all participants in the control group were coded as missing values. To test the robustness of our results, we also used an alternative coding scheme in which the families with one negative answer (e.g., the child did not visit the website) and one missing answer (no answer from the parent) were coded as missing values instead of noncompliers. Because the different ways of coding did not produce substantially different results, we report only the results of the first, more conservative coding strategy here. The results of the other coding scheme can be found in the Supplemental Material (Tables S1 and S2).

4.4 Instruments of parent questionnaire

Appendix B includes sample items and scale reliabilities for all constructs. We ran confirmatory factor analyses to test the measurement properties of the adapted and self-developed scales, all of which revealed an acceptable model fit (see Supplemental Material, Table S3). Regarding validity, these scales showed high and low correlations with scales measuring conceptually similar and different scales, respectively, supporting their convergent and discriminant validity (see Table 2).

4.4.1 Utility value beliefs

Parents were asked to rate the extent to which they perceived school in general, math, German, and English to be useful for their child. This *utility value for child* scale was measured with three items for each subject with parallel wording (Häfner et al.

Table 2 Correlations for Parent and Student Variables at Pretest

Variables	Parent variables									Student variables								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<i>Parent variables</i>																		
1 School utility for child																		
2 Math utility for child	.49***																	
3 German utility for child	.46***	.57***																
4 English utility for child	.44***	.61***	.74***															
5 Career communication	.13	.13	.16	.15														
6 Career autonomy	.04	.05	.18***	.09	.17***													
7 Career support	.17*	.18**	.24*	.20*	.36***	.23***												
8 Importance career support	.21*	.19*	.29*	.24*	.37***	.22***	.67***											
9 School communication	.14*	.13*	.17***	.13*	.36***	.05	.16*	.13										
<i>Student variables</i>																		
10 School utility	.13	.14***	.11*	.11	-.02	.00	.06	-.01	-.02									
11 Math utility	.07	.26***	.02	.04	-.10	-.02	.05	-.02	-.10*	.46***								
12 German utility	.13	-.02	.13**	.13*	.11	-.02	-.09	-.04	.10*	.36***	.13*							
13 English utility	.06	-.05	.10	.19**	.07	.01	-.07	.01	-.07	.21*	.13*	.31***						
14 Career communication	.05	-.05	.01	-.01	.26***	.03	.10	.15**	.18*	.13*	.06	.17**	.10					
15 Career autonomy	.02	-.02	-.03	.02	.00	.09	-.01	.03	.05	.24***	.17**	.12*	.17***	.23***				
16 Career support	-.07	-.05	-.05	-.03	.12	.00	.05	.01	.08	.22***	.16*	.18**	.11*	.52***	.41***			
17 Career decision	-.02	.01	.01	.00	.03	.07	.13*	.02	.04	.03	.04	-.07	-.07	.21***	.10	.10		
18 Career exploration	-.05	-.12	-.04	-.02	.05	.02	-.05	.00	.04	.18**	.10	.20***	.15*	.32***	.20*	.40***	.05	
19 Career involvement	.01	-.02	.00	.02	.06	.03	-.06	-.01	-.09	.31***	.10	.25***	.19*	.26***	.31***	.36***	-.03	

The pattern of correlations at posttest were comparable
 * $p < .05$. ** $p < .01$. *** $p < .001$

2017) and with four items for school in general (slightly adapted from Harackiewicz et al. 2012). All items were rated on a 5-point Likert-type scale ranging from 1 (*not at all useful*) to 5 (*very useful*).

4.4.2 Communication

Communicating about school and career-related topics with the child were both measured with four items on a 4-point Likert-type scale ranging from 1 (*never*) to 4 (*very often*). For *school communication*, a scale from the Trends in Mathematics and Science Study (TIMSS) 2007 was used (Bos et al. 2009). The items for assessing *career communication* were self-developed.

4.4.3 Career supportive behavior and beliefs

The *career autonomy* parents granted to their children was measured with five self-developed items. Parental *career support* was assessed with a scale by Dietrich and Kracke (2009) consisting of five items. Parents' perceived *importance of career support* was measured with four items (adapted to the career context from Walker et al. 2005). All items were measured on a 4-point Likert-type scale ranging from 1 (*disagree*) to 4 (*agree*).

4.5 Instruments of student questionnaire

4.5.1 Utility value beliefs

Students' perceived *utility value* for school in general, math, German, and English was assessed with a questionnaire developed and validated in previous studies by Gaspard et al. (2015b, 2017). For our study, we chose two subscales that best covered the constructs that we addressed in our intervention, namely, the subfacets tapping utility for daily life (three items) and utility for job (four items). These seven items were combined into one utility value scale for school and for the three subjects, respectively. They were answered on a 4-point Likert-type scale ranging from 1 (*completely disagree*) to 4 (*completely agree*).

4.5.2 Parental career supportive behavior

Students' perception of their *career communication* with their parents and their parents' *career autonomy* and *career support* were assessed with items that were parallel to the parent questionnaire.

4.5.3 Students' career orientation behavior

To assess how deeply students were involved in their career decision and the extent to which they sought information about possible careers, we measured their *career decision*, *career exploration*, and *career involvement*. For their career decision, we used a 12-item scale by Seifert and Stangl (1986). Students' career exploration was

measured with seven items (Kracke 1997), and the importance they attached to career involvement was measured with eight items (Kaak et al. 2013). All items were assessed on a 4-point Likert-type scale ranging from 1 (*completely disagree*) to 4 (*completely agree*).

4.6 Statistical analyses

All statistical analyses were conducted in Mplus 7.31 (Muthén & Muthén 1998–2012). The clustered data structure in which students were nested in classes¹ was accounted for with the design-based correction of standard errors (see McNeish et al. 2017, for a justification of this approach).

4.6.1 Intention-to-treat analyses

The approach that is traditionally used to analyze intervention effects in randomized studies is the Intention-to-treat (ITT) analysis (Sagarin et al. 2014). In this approach, the groups that are compared are formed only by the condition that participants were randomly assigned to. In order to estimate the ITT effects, we specified separate multiple regression models for all outcome variables for parents and students. Each model contained an indicator of the intervention condition as a predictor. Testing for pretest differences between the intervention and control groups revealed that only two out of 19 tests were significant (parental career support, $d=0.32$, and importance of career support, $d=0.22$). All results on pretest differences can be found in the Supplemental Material (Table S5). Nevertheless, in order to obtain more precise estimates of intervention effects, as suggested by Raudenbush (1997), pretest scores on the respective variables were included as covariates in the models. To facilitate the interpretation of the results, all variables were standardized beforehand. Thereby, the regression coefficients for the dichotomous indicator of the intervention group can be directly interpreted as effect sizes.

4.6.2 Complier average causal effect analyses

In randomized intervention studies, conventional ITT analyses can generate misleading results if participants are not responsive to the treatment (Hirano et al. 2000). In such cases, Complier Average Causal Effect (CACE) analyses are an appropriate way to take into account information about participants' compliance with the treatment (Sagarin et al. 2014; for an example of a CACE analysis applied in an intervention study, see Nagengast et al. 2018). CACEs represent the treatment effect on intervention-group participants who were actually compliant with the treatment (i. e., who embraced the treatment as intended; Sagarin et al. 2014). Typically, compliance is assumed to be a dichotomous measure. However, as information about

¹ Intra-class correlation coefficients on the class as well as the school level at pretest were very small for all outcomes ($0.00 \leq ICC \leq 0.04$ on the school level, $0.01 \leq ICC \leq 0.04$ on the class level; see Supplemental Material, Table S4). Therefore, dependencies at the school level could be disregarded. Only the class level was considered.

the compliance status of participants in the control group was missing because they could not be compliant with an intervention they were not allowed to access, two further assumptions are required to identify CACEs. First, the *Exclusion Restriction* (Angrist et al. 1996) is typically applied. This implies that assignment to the treatment condition does not have an effect on the outcome other than through compliance with the intervention (Sagarin et al. 2014). If the *Exclusion Restriction* holds, the potential outcome of a participant who was assigned to the intervention group but did not use the treatment (i. e., a noncomplier) is the same as it would be if the person had been assigned to the control group. In our study, we would not expect any changes in the outcome variables for the noncompliers who were assigned to the intervention group but did not visit the website. Thus, the *Exclusion Restriction* seemed to be plausible in the current study.

The second assumption is the *Monotonicity Assumption*, which implies that there are no so-called defiers, that is, participants who would refuse to take the treatment when assigned to the intervention condition and would take the treatment when assigned to the control condition (Angrist et al. 1996). This hypothetical group of participants would always act against their treatment assignment, which seems to be very unlikely. In our study, the assumption that there were no defiers was plausible.

To consider the compliance status, we conducted CACE analyses that included families' compliance with the intervention. To this end, we specified separate multivariate mixture models for all outcome variables of parents and students. The dichotomous compliance status variable served to define the latent classes of compliers and noncompliers (Jo and Muthén 2001). In both latent classes, the intervention condition served as the predictor in the model. Again, pretest scales were included as covariates, and all continuous variables were standardized.

4.6.3 Missing data

Apart from the compliance measure, the percentage of missing data ranged from 14.6 to 26.1% for parent variables and from 5.3 to 19.6% for student variables (pretest and posttest). In all analyses, we used the full information maximum likelihood approach implemented in Mplus to deal with missing data. This approach takes all available information into account to estimate the model parameters (Schafer and Graham 2002).

5 Results

5.1 Descriptive statistics and correlations

Descriptive statistics for the outcome variables at pre- and posttest are displayed in Table 3 separately for the intervention and control groups. Correlations for parent and student variables at pretest can be found in Table 2.

Regarding the mean levels on the parent variables at pretest, there was some indication for ceiling effects for the utility and career scales in both the intervention and control groups (e. g., school utility for child: $M = 4.39/4.47$, scale 1–5; career support:

Table 3 Descriptive Statistics for Parent and Student Variables at Pre- and Posttest

	Intervention group				Control group			
	Pretest		Posttest		Pretest		Posttest	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>Parent variables</i>								
School utility for child	4.39	0.77	4.35	0.79	4.47	0.60	4.35	0.72
Math utility for child	4.14	0.84	4.24	0.82	4.12	0.72	4.14	0.85
German utility for child	4.44	0.65	4.46	0.69	4.40	0.56	4.37	0.67
English utility for child	4.32	0.71	4.37	0.69	4.31	0.64	4.30	0.71
Career communication	2.78	0.52	2.74	0.56	2.72	0.58	2.75	0.61
Career autonomy	3.36	0.43	3.34	0.50	3.40	0.45	3.38	0.47
Career support	3.54	0.59	3.31	0.63	3.34	0.65	3.41	0.59
Importance career support	3.66	0.51	3.44	0.58	3.55	0.48	3.51	0.52
School communication	2.90	0.55	2.88	0.58	2.83	0.53	2.78	0.51
<i>Student variables</i>								
School utility	2.97	0.45	2.95	0.48	3.01	0.45	2.96	0.49
Math utility	2.87	0.70	2.86	0.62	2.86	0.69	2.88	0.63
German utility	2.93	0.67	2.94	0.69	2.86	0.72	2.88	0.72
English utility	3.30	0.61	3.21	0.62	3.25	0.60	3.24	0.56
Career communication	2.74	0.63	2.67	0.60	2.69	0.63	2.60	0.60
Career autonomy	3.18	0.57	3.18	0.59	3.27	0.53	3.17	0.58
Career support	3.06	0.62	3.00	0.66	3.02	0.58	2.94	0.69
Career decision	2.67	0.62	2.69	0.59	2.61	0.60	2.71	0.60
Career exploration	2.68	0.57	2.69	0.47	2.73	0.45	2.65	0.59
Career involvement	3.38	0.51	3.32	0.59	3.43	0.46	3.36	0.56

The utility for child scales were measured on a scale ranging from 1 to 5. All other scales were measured on a scale ranging from 1 to 4

$M=3.54/3.34$, scale 1–4). Students' own utility values at pretest were at a medium level except for English, which had exceptionally high ratings ($M=3.30/3.25$, scale 1–4). Other tendencies toward ceiling effects were found for students' perceptions of their parents' career autonomy ($M=3.18/3.27$, scale 1–4) and career involvement ($M=3.38/3.43$, scale 1–4).

The correlation pattern reveals that students and parents seem to perceive their interactions differently to some extent. For example, regarding career communication, autonomy, and support, we found low to zero correlations between parents' and students' perceptions ($-.01 \leq r \leq .26$). Regarding correlations among parent and student variables, parents' utility perceptions for their child for the different subjects correlated relatively highly ($.44 \leq r \leq .74$), whereas the correlations between students' own utility perceptions were only small to medium ($.13 \leq r \leq .46$). As expected, the measures for parents' career-related behavior were positively interrelated from both the parents' ($.17 \leq r \leq .67$) and students' perspectives ($.23 \leq r \leq .52$). Students' career-related behaviors were positively related to their perception of their parents' behavior ($.20 \leq r \leq .40$).

5.2 Intervention effects on parent and student variables

The results of the ITT and CACE analyses for testing the intervention effects looked very similar. Overall, we found only a few intervention effects at posttest (Table 4).

In the ITT analysis for parents, we found a negative intervention effect on career support for their children ($\beta = -.30$, $p = .002$). There was also a tendency toward a negative effect on the importance parents attached to their career support, but it missed significance ($\beta = -.24$, $p = .054$). There were no effects on parents' utility perceptions for their children that were statistically significant. The regression coefficients for parents' career communication, career autonomy and school communication were small and nonsignificant, too.

The results of the CACE analyses showed a similar pattern. Again, we found negative intervention effects on parents' career support ($\beta = -.44$, $p = .001$) and its perceived importance ($\beta = -.36$, $p = .008$). The effects were a little larger than in the ITT analysis. In the CACE analyses, the regression coefficients for other constructs (e. g., career communication and career autonomy) were larger but still not significant. Again, we did not find an effect on parents' perceived utility of the subjects for their children or on school communication.

Table 4 Intervention Effects on Parent and Student Variables at Posttest

Outcome variable	ITT			CACE		
	β	SE	p	β	SE	p
<i>Parent variables</i>						
School utility for child	.02	.14	.911	-.06	.12	.659
Math utility for child	.04	.08	.655	-.10	.10	.301
German utility for child	.11	.10	.270	.02	.13	.898
English utility for child	.07	.10	.445	-.06	.14	.688
Career communication	-.10	.09	.287	-.28	.17	.100
Career autonomy	-.07	.09	.444	-.17	.11	.106
Career support	-.30	.10	.002	-.44	.13	.001
Importance career support	-.24	.12	.054	-.36	.14	.008
School communication	.10	.08	.207	.09	.14	.505
<i>Student variables</i>						
School utility	.10	.11	.388	.08	.14	.588
Math utility	-.01	.12	.933	.02	.16	.905
German utility	.13	.10	.194	.12	.18	.492
English utility	.01	.07	.902	.01	.14	.928
Career communication	.09	.11	.396	.14	.16	.402
Career autonomy	.12	.12	.291	.15	.16	.358
Career support	.12	.16	.452	-.03	.15	.854
Career decision	-.18	.10	.066	-.10	.13	.460
Career exploration	.12	.13	.358	.22	.14	.100
Career involvement	.05	.17	.780	-.05	.13	.721

For students, there were no significant intervention effects in the ITT analyses or the CACE analyses. In the ITT analyses, there was a tendency for students' career decision ratings to decline ($\beta = -.18$, $p = .066$), but this effect was not significant. In the CACE analyses, the largest but still nonsignificant coefficient was found for career exploration, for which students reported higher values after the intervention ($\beta = .22$, $p = .100$). All other coefficients for students' utility value beliefs and career orientation as well as for their parents' career supportive behavior were relatively small.

6 Discussion

In a cluster-randomized study, we investigated the effects of a parent-based utility-value intervention on parents' and students' utility values and career orientation. We aimed to conceptually replicate Harackiewicz et al.'s (2012) findings and also to expand the focus to include the transition from school to work. Unfortunately, we found only that the parents in the intervention condition reported less career support for their children afterwards and that they perceived their career support to be less important. No intervention effects were found for other parent or student outcomes.

6.1 Decline in parental career support

Our findings indicate that the parents in the intervention condition reported less support for their children's career orientation. As our intention was to get parents and children to focus more on students' future careers, the intervention did not work as expected. However, it is important to keep in mind that we did not observe parents' actual behavior but asked them about their perception of their own behavior. It might therefore be possible that parents did not really support their children less, but perhaps the intervention caused them to recalibrate how much support they gave at posttest. Self-perceptions are influenced by comparisons with a certain frame of reference (Bong and Skaalvik 2003), which might have changed. After parents learned about the many other people or institutions that might be involved in their children's career orientation, they may have perceived their own support as less in quantity and as less important. In addition, we did not find these negative effects on the same scales from the students' perspective, and this finding is in line with the idea that parents did not actually change their support.

If parents really reduced their career support, one explanation could be that they perceived themselves as less competent in supporting their children after realizing how many career options their children have. In addition, after learning that there are many other sources of support their children can seek out, they may consequently leave this task to others. Previous studies have also reported that parents sometimes offer less career support if they perceive their own lack of competence (Dietrich and Kracke 2009).

Regarding research on parental involvement in general, our finding of less parental support does not have to be solely negative. As reported by Pomerantz et al. (2005), too much parental involvement can even have a negative effect on students' in-

trinsic motivation. Thus, the right amount of parental autonomy support is crucial for students' sense of autonomy (Grolnick et al. 2009). Especially regarding career orientation, when adolescents discover their own interests and gain the experience of making choices with far-reaching effects, they should experience autonomy and personal responsibility. On our website, we tried to highlight the importance of parents' autonomy support for their children. Perhaps some parents had been engaging in more active and intrusive career supportive behavior, but after exploring the website, they realized they should reduce their (intrusive) career support. From this perspective, the potential decline in parents' career support might represent a positive impact.

6.2 Absent intervention effects and failed replication

We did not achieve our aim of replicating the findings from Harackiewicz et al. (2012) who had successfully promoted participants' utility value beliefs and career choices with a simple intervention. Although their intervention was successful, later analyses revealed that girls with low previous achievement did not benefit from the intervention due to low success expectancies, which seemed to negate the positive intervention effect (Harackiewicz et al. 2012; Rozek et al. 2015).

In our study, there are several potential reasons for the failure to find intervention effects. First, our intervention might not have been designed and implemented appropriately for the target group. Perhaps if we had repeatedly invited the families to visit the website, this would have been more effective. In contrast to Harackiewicz et al.'s longitudinal study, in which families were sent informational brochures in addition to an invitation to visit the website and thus received more exposure to the intervention, we sent the website link only once. It might also be the case that the parents in that study visited the website more often or examined it more closely than the parents in our study because they were used to complying with what was expected of them. Furthermore, the social backgrounds of the samples were different. About one third of our families had an immigration background, which probably made it more difficult to reach them (e.g., due to language problems). Moreover, it is possible that the content of our website, which focused on information about the utility of subjects and career possibilities, did not meet participants' needs. Although we intended to help parents connect with their children, parents might not have used the information as expected or might have needed more advice on how to handle certain topics (e.g., uncertainty in the stage of career orientation). It is also possible that fostering parents' and students' utility value for career orientation behavior itself, instead of their utility value for school, would have been more effective, as the former is more closely connected to the activities that the intervention was supposed to change.

Second, parents and students showed relatively high mean levels at pretest on several utility value scales. These ceiling effects might indicate that there was perhaps no great need to intervene, and that, for example, parents may have already been convinced of the utility of school for their child. Maybe it is not the usefulness of school that needed to be fostered but rather other autonomy supportive aspects, such as providing choices to children (Grolnick et al. 2009). Furthermore, in our

study, students and parents showed rather low levels of career communication. Thus, further intervention studies could target career communication and career autonomy more systematically.

6.3 Limitations and future research

For the interpretation of our results, some limitations should be kept in mind. First, our sample was limited to eighth graders from German middle-track schools. We deliberately chose this school type and specifically developed the website for our participants. Thus, future research should adapt the intervention to test whether the results look different for other school types. Second, we only assessed perceptions and no actual career orientation behavior. We found low correlations between parents' and students' ratings of parental career supportive behavior, indicating that they differ in their perceptions of their behavior to some extent. Thus, it would be interesting to further investigate what actually happens when parents and students talk about the website content at home. This could help to better illuminate the processes of information transfer between parents and students as well as the role parents play in influencing their children's career orientation. Third, we did not succeed in tracking data on the length of parents' and students' website visits. If participants spent only a few minutes visiting the website, we might not expect a change in their beliefs or behaviors. Our intervention may have been too weak regarding active engagement, relative to previous intervention programs that used a combination of parent and teacher support (Mayhack 2011) or were designed as career workshops (e. g., Hirschi and Läge 2008; Koivisto et al. 2010). In future studies, it will be important to measure the duration of time spent actively engaged with the intervention material, to evaluate how long and how intensive the intervention needs to be to work optimally. Finally, it is possible that the intervention setting at home made it difficult for students to link the website content to their school subjects and curricula. A classroom-based intervention might have been more effective in fostering students' utility value beliefs.

In general, although we put effort into designing an appropriate intervention, we may not have met the needs of our specific sample or they might not have used the intervention as intended. Parents in this context might need more specific information on how to handle difficulties within the career orientation process or a stronger encouragement to actively support their children in an autonomy supportive way. Students in this context might need an intervention that affords more active engagement and allows them to directly connect to their subjects. Our study points to the fact that utility-value interventions are sometimes not as easy to implement as they seem, as many parameters influence the success of such interventions. Thus, researchers should consider the specific context and participants' needs and should incorporate suitable and reliable measures when developing and implementing such interventions.

Funding This research project is part of the research program "Netzwerk Bildungsforschung" (Educational Research Network) of the Baden-Württemberg Stiftung. This research was also supported by the Eliteprogramme for Postdocs of the Baden-Württemberg Stiftung and the Postdoc Academy of the Hector Research Institute of Education Sciences and Psychology, Tübingen, funded by the Baden-Württemberg

Ministry of Science, Research and the Arts. Heide Kneißler is a doctoral student at the LEAD Graduate School and Research Network [GSC1028], funded by the Excellence Initiative of the German federal and state governments.

Appendix A

Website content and structure

1. Information for parents on how to support their children's career choice and school achievement; communication tasks to connect with the child regarding the usefulness of school and the child's future career
2. Information for students, invitation to explore the website
3. Usefulness of school in general and of math, German, and English for students' future career and daily life
4. Information on different career possibilities; self-assessment tests for career choice
5. Information on how to continue going to school after completing middle-track school after 10th grade
6. Information on the roles that self-concept and effort play in school achievement
7. Additional informational sources and links

Appendix B

Table B.1 Sample Items and Scale Reliabilities for Student and Parent Variables

Construct	Sample item	α_{T1}
<i>Parent variables</i>		
School utility for child	How useful will a school education be for your child in general?	.94
Math/German/English utility for child	How useful will ... be for your child's future career?	.88/.85/.83
Career communication	How often do you talk to your child about the career opportunities he/she will have after finishing middle-track school?	.84
Career autonomy	I leave it to my child what he/she will do after finishing school (vocational training, high school ...)	.68
Career support	I help my child search for an appropriate field of study or vocational training	.90
Importance career support	It is important to me to encourage my child to think about his/her future career	.88
School communication	How often do you talk to your child about things he/she has learned at school?	.80
<i>Student variables</i>		
School utility	What we learn in school is directly applicable to my everyday life	.77
Math/German/English utility	Good grades in ... will bring many advantages for my job and my career	.91/.91/.88
Career communication	How often do you talk to your parents about your career aspirations?	.81
Career autonomy	My parents are open to my career aspirations	.84
Career support	My parents call my attention to different possible careers	.86
Career decision	I already know quite well what requirements my favorite career has	.89
Career exploration	I talk to as many people as possible about jobs I am interested in	.76
Career involvement	It is important to me to clarify what jobs I am qualified for	.88

α_{T2} were comparable

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