Career Adaptability and Vocational Identity of Commercial Apprentices in the German Dual System

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Abstract

The construct of career adaptability has recently gained importance in research on vocational development and has led to a variety of theoretical and empirical approaches. Alongside with vocational identity it has been theorised as the crucial meta-competency of modern career construction. Due to its roots in adolescent career development, career adaptability is not limited to the vocational adjustments of working adults, but is also highly relevant for the pre-occupational orientation processes of adolescents initially developing a vocational identity. Despite the recent increase in empirical research on career adaptability, the field of vocational education has been largely neglected so far. Therefore, a quantitative survey among nearly $N = 400$ commercial apprentices within the German dual system of VET has been conducted. This study focuses on the replication of the Career Adapt-Abilities Scale (CAAS) among commercial apprentices within the German dual system, and its discrimination against alternative operationalisations of career adaptability. Furthermore, the relationship between career adaptability and vocational identity (operationalised as occupational and organisational identification) was explored. Results showed that the four-dimensional structure of career adaptability covered by the CAAS could be largely replicated in the dual system. In addition, it was found that the CAAS can in part be separated from alternative operationalisations. Finally, the results confirmed career adaptability positively predicts both foci of identification in a cognitive and affective manner. This indicates that career adaptability can be seen as a beneficial factor for vocational education and training as it fosters the vocational ties of apprentices in terms of their identity.

Keywords Career adaptability · Vocational identity · Identification · Vocational education · Dual system

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Introduction

In the face of a changing world of work and increased demands for vocational flexibility, a key focus of research on career development is on the corresponding challenges for the individual. On the one hand, a high degree of self-directedness and autonomy is required to maintain vocational continuity within a constantly transforming work environment (Vondracek et al. 2010). On the other hand, there is a growing need for individual willingness and ability to change and learn facing novel vocational development tasks. In this context, career adaptability has recently become an important construct (Savickas 2013) which is illustrated by the emergence of various theoretical conceptualisations as well as a vast increase in empirical research (e.g. Johnston 2016; Rudolph et al. 2017).

According to the majority of approaches, career adaptability is conceived as the individual ability of working adults to adjust to transformations of one's working environment (Fugate et al. 2004; Hall 2004; Rottinghaus et al. 2005). Career adaptability is mostly associated with a vocational flexibility orientation or mobility preference and a rather declining occupational and organisational commitment. However, career adaptability also comprises an integrative momentum as it was originally introduced as a replacement for *vocational maturity*. Characterising adolescent career development, the latter term was deemed inappropriate when exploring vocational development in adults (Super and Knasel 1981) and the completion of development tasks in a constantly changing world of work (Savickas 1997). Following this approach, Savickas conceptualises career adaptability as 'an individual's psychosocial resources for coping with current and anticipated vocational development tasks, occupational transitions, and work traumas that [...] alter their social integration' (Savickas 2013, p. 157). Consequently, career adaptability is an important construct regarding adolescent career development as well as vocational development in adults and has thus to be considered highly relevant for vocational education and training (VET). Due to its roots in career development research on adolescents, the construct is seen as an important factor concerning the occupational orientation processes before stepping into the world of work (e.g. Hirschi 2009). Pertaining to vocational education and training, which is quite prevalent especially within the German context, this pre-vocational orientation results in choosing a vocational domain and a corresponding training occupation. Career adaptability is not only a central construct in the process of career preparation and choosing an apprenticeship, but is also a key element of dealing with adjustment tasks throughout one's initial vocational training. By participating in a vocational training programme, apprentices have to adapt to a new working and learning environment. Within the German dual system, apprentices spend part of their training time at a company and the other part at a vocational school. This cooperative system builds on occupation-specific profiles and curricula to ensure the national standardisation of apprenticeship programmes, which usually last two to three-and-a-half years. While dealing with the corresponding domain-specific requirements and career opportunities for the very first time, career adaptability appears to be beneficial for the apprentices' professionalisation and the development of vocational identity. According to Savickas, 'career adaptability enables individuals to effectively implement their self-concept in occupational

roles' (2005, p. 51). Contrary to the conception of career adaptability as a vocational flexibility or mobility orientation, this indicates a positive relationship between apprentices' career adaptability and the development of their work-related ties. In this sense, career adaptability can be viewed as a key factor influencing vocational learning as a process of identity development at work (Brown and Bimrose 2018). Developing students' work-related identity is a major goal of the German dual vocational training system, as it is seen as a crucial factor of students' learning and performance (Baethge et al. 2009b). Klotz et al. (2014) found that the vocational identity of apprentices in the commercial domain is closely related to their vocational engagement and competence. Due to their generalistic training, commercial apprentices in Germany look at a broad range of career options and display rather loose vocational ties compared to apprentices in other domains (Bühler 2007). Seeber (2013) found that only one third of commercial apprentices in Germany have a follow-up solution a few months before completing their training. Empirical data for similar apprenticeship programmes in the German-speaking part of Switzerland show that while more than half of the apprentices intend to remain within the commercial field at the end of their training, one in four was uncertain whether to stay and almost one in fifth does not intend to remain (Forster-Heinzer et al. 2016).

Despite the significant increase of empirical research on career adaptability in recent years (Rudolph et al. 2017), the role of career adaptability within (dual) vocational education has been largely neglected in research so far. This can mainly be explained by the fact that the various approaches of (career) adaptability were developed in the Anglo-Saxon context, where the non-academic transition into work is quite different from Germany. As vocational apprentices in the German dual system are neither solely students nor solely professionals, they cannot be clearly assigned to the two typical research foci concerning career adaptability. Nevertheless, undergoing an apprenticeship is a crucial time for the vocational development of young adults and career adaptability can be seen as a significant factor within this process. In order to harness its potential for vocational education and training it has to be clarified, whether the construct of career adaptability is empirically applicable in the context of initial vocational training and how different approaches differ in this regard. Furthermore, to provide guidance on whether career adaptability is indeed a desirable characteristic among apprentices and should thus be promoted, its relationship to work-related ties as key outcomes of initial vocational training should be investigated.

Therefore, this study elaborates on the following research questions: Can Savickas' conceptualisation of career adaptability be empirically replicated among commercial apprentices in the German dual system? Does Savickas' approach cover the same aspects as alternative theoretical and empirical conceptualisations of career adaptability, or can it be empirically discriminated against these approaches? How is the career adaptability of commercial apprentices in the German dual system related to their vocational identity development?

For this purpose, a quantitative survey among nearly $N = 400$ apprentices within the commercial domain of the German vocational education and training system has been conducted. Before the methodological proceedings and empirical results are outlined in the following, theoretical conceptualisations and empirical approaches concerning career adaptability and vocational identity are considered in detail. The results are discussed with regard to their significance for VET.

Theoretical and Empirical Approaches to (Career) Adaptability

Savickas: Origins and Current Understanding of Career Adaptability

Career Adaptability can be found in a broad range of different approaches of which most refer to Savickas' theoretical conceptualisation (1997, 2002). Savickas originally defines career adaptability – as a replacement for career maturity – merely motivational as the readiness to cope with two challenges: 'with the predictable tasks of preparing for and participating in the work role and with the unpredictable adjustments prompted by changes in work and working conditions' (Savickas 1997, p. 254). He further integrates the term as a central element of his career construction theory (Savickas 2002). In a first conceptual refinement, Savickas outlines four dimensions of career adaptability (4 Cs): concern, control, curiosity, and confidence (2005). *Concern* represents an optimistic future orientation and being planful, whereas *control* is associated with decision making and an internal locus of control. *Curiosity* stands for the ability to explore one's own strengths and preferences as well as the requirements and benefits of different vocational environments. *Confidence* covers self-efficacy expectations with regard to one's vocational development. Contrary to the initial definition, career adaptability is no longer conceived solely as readiness, but rather includes attitudes, behaviours and competencies. (Savickas' additional differentiation into attitudes, beliefs and competencies (ABCs of career construction) within each of the four sub-dimensions is not discussed in detail due to lack of relevance for the empirical operationalisation. For further information see Savickas (2005, 2013).)

In order to measure the four-dimensional structure, the Career Adapt-Abilities Scale (CAAS) has been introduced (Savickas and Porfeli 2012) and meanwhile proven to be the most widely used operationalisation of the construct. The increasing empirical clarification of the construct has been accompanied by a theoretical refinement: 'career-adaptability resources are the self-regulation strengths or capacities that a person may draw upon to solve the unfamiliar, complex, and ill-defined problems presented by developmental vocational tasks, occupational transitions, and work traumas' (Savickas and Porfeli 2012, p. 662). In contrast to this, the 'personality trait of flexibility and willingness to change' (ibid.) as a sort of motivational foundation for the adaptability resources is referred to as *adaptivity* or *adaptive readiness*. Consequently, Savickas integrates *adapting* or *adapting responses* as a third category, which involves adaptive behaviours in the face of career planning or exploration. Finally, adapting behaviours lead to *adaptation results*, which cover a broad range of career related outcomes such as occupational commitment and identification or indicators of work success. This modified conceptualisation contributed to a more coherent view within the existing literature on career adaptability and from then on served as a conceptual framework in many recent empirical studies (Savickas 2013; Hirschi et al. 2015; Johnston 2016; Rudolph et al. 2017).

Alternative Approaches to (Career) Adaptability

Despite the development and sophistication of the career adaptability construct, several alternative conceptualisations were established, which – to some degree – can be traced back to Savickas' approach. Within protean career theory, Hall (2004) considers

adaptability and *identity* (or self-awareness) to be the two meta-competencies that are crucial for modern careers. They enable individuals 'to learn from their experience and develop any new competencies on their own' (ibid, p. 6). *Identity* hereby implies the ability to form a reflected and, if necessary, flexible view of oneself. *Adaptability* covers identifying future needs regarding one's vocational performance as well as making individual changes in response (Briscoe and Hall 1999, p. 48 f.). According to Briscoe and Hall, developing either one of these meta-competencies without the other is not desirable and results in a simple reactivity (only adaptability) or a very self-aware paralysis (only identity). In a further development, Morrison and Hall (2002) strongly refer to the extension of career maturity by Super and Knasel (1981) and Savickas himself (1997). In doing so, they view adaptation in accordance with Piaget not only as an unilateral influence of the environment on the individual (accommodation), but also as the individual's impact on the environment (assimilation).

However, this differentiated approach was not continued by Hall and colleagues. Instead the meta-competencies of adaptability and identity were replaced by two other terms: *self-directed* and *values driven* (Briscoe and Hall 2006). *Self-directed* in this context means 'having the ability to be adaptive in terms of performance and learning demands' (ibid, p. 8). *Values driven* resembles *identity* 'in the sense that the person's internal values provide the guidance and measure of success for the individual's career' (ibid.). Analogous to the initial approach, a *protean mindset* or *protean career attitude* is present, if people are 'both values driven in defining their career priorities and identity, as well as self-directed in adapting to the performance and learning demands of the career' (ibid). However, Hall and colleagues (Briscoe and Hall 2006; Briscoe et al. 2006) further extend their approach by connecting the protean career concept to the boundaryless career concept (Arthur and Rousseau 1996). By combining the four dimensions of the *protean mindset* and the *boundaryless career attitude* (physical and psychological mobility), Briscoe and Hall (2006, p. 15) find eight typological career profiles, amongst which the *protean career architect* is the one scoring high on all four dimensions. This illustrates the proximity between Hall and colleagues' conceptualisation of self-directedness (as successor of adaptability) and the boundaryless career which is associated with transcending organisational and occupational ties. Therefore, their understanding of adaptability seems to deviate from Savickas' approach.

Another conceptualisation of adaptability can be found in the most prominent approach concerning the employability construct. Fugate et al. (2004) conceptualise employability consisting of three dimensions: career identity, personal adaptability, and social and human capital. Except for the dimension of social and human capital, there is a clear similarity to Hall's approach of adaptability and identity as mutually related constructs. Adaptability resides in the core of employability and is defined as being 'willing and able to change personal factors [...] to meet the demands of the situation' (ibid., p. 21). The authors identify five individual differences that determine personal adaptability and resemble Savickas' four dimensions of career adaptability (4 Cs). Therefore, these five individual differences can relatively accurately be assigned to the 4 Cs according to Savickas: Optimism (concern), internal locus of control (control), propensity to learn and openness (curiosity), and generalised self-efficacy (confidence).

Although being allegedly conceptually related, the operationalisation of employability displays a significant difference between the two approaches. McArdle et al. (2007) proposed a measure for Fugate's model by drawing upon existing scales. To measure

personal adaptability, they use *proactive personality* and *boundaryless mindset* as proxies revealing differences compared to Savickas' conceptual understanding of adaptability. Within the latter, *proactive personality* is not taken into account as a measure for adaptability but rather as a main indicator of *adaptivity*, its trait-like basis (Savickas and Porfeli 2012, p. 662). Aptly, Fugate and Kinicki clarify in a further development, that dispositional employability tends to resemble traits promoting career adaptability and competence development (2008, p. 509). Recognising this, personal adaptability in the context of the employability construct appears to be located in the first category of the previous mentioned conceptual framework (*adaptivity* – *adaptability* – *adapting* – *adaptation*). Despite criticism of the lack of theoretical foundation (Johnston 2016, p. 6) – in particular given the unfounded adoption of the *Boundaryless Mindset Scale* – the study of McArdle et al. (2007) has been widely referred to when operationalising adaptability (as a part of employability).

The construct of career adaptability is also (next to career optimism and perceived knowledge) part of the *Career Futures Inventory* (CFI), a measure for beneficial career planning attitudes (Rottinghaus et al. 2005). Hereby, Rottinghaus and colleagues refer to Savickas' original introduction of the career adaptability term (1997). They define career adaptability as 'a tendency affecting the way an individual views his or her capacity to plan and adjust to changing career plans and work responsibilities, especially in the face of unforeseen events' (Rottinghaus et al. 2005, p. 5). In Savickas' operationalisation, career adaptability is based on four resources which address the capability to adapt rather implicitly. In contrast, Rottinghaus and colleagues explicitly cover the self-perceived ability of adapting to external changes prompted by one's working environment. Thus, they do not outline an alternative theoretical conceptualisation to career adaptability but operationalise it in a different way. To sum up, it is obvious that Rottinghaus et al., Hall et al. and Fugate et al. specifically focus on adaptation needs and flexibility requirements of working adults, whereas Savickas additionally emphasises that career adaptability – due to its origins as a replacement for career maturity – is also of major importance for adolescents and young adults beginning a career (Table 1). Consequently, Savickas' approach seems to be not only more elaborate and consistent, but also more suitable for investigating career adaptability in apprentices.

The Relationship between Adaptability and Identity

When comparing the different approaches, it becomes evident that career adaptability is in some way related to vocational identity. Within the protean career theory (Hall) and the employability construct (Fugate), adaptability represents the capability to meet the demands of a changing environment, while identity has the role of some sort of orientation function guiding the individual in these ambiguous situations. With reference to Hall (2002), Grote and Raeder (2009, p. 220) point out that in career research the term identity is often used rather generally as a synonym for one's self-concept and sense of self, while more differentiated approaches can be found in identity research. Savickas (2011) adopts the view of identity and adaptability not only as related constructs, but as the two crucial meta-competencies of post-modern careers that 'give individuals a sense of when it is time to change and the capacity to change' (Porfeli and Savickas 2012, S. 749). Accordingly, in the validation of the Career Adapt-Abilities

Table 1 Synopsis of different adaptability approaches

Term	Savickas (2005, 2013)	Fugate et al. (2004)	Hall (2004)/ Briscoe and Hall (2006)	Rottinghaus et al. (2005)
Reference to Savickas (1997)				
Sub-dimensions/ Aspects	Career adaptability	Personal adaptability	Adaptability/ Self-directed	Career adaptability
	X	X	X	X
	Concern Control Curiosity Confidence	Optimism Internal locus of control Propensity to learn Openness Generalised Self-Efficacy	one-dimensional: 'ability to be adaptive in terms of performance and learning demands.' (Briscoe and Hall 2006, p. 8)	one-dimensional: 'capacity to plan and adjust to changing career plans and work responsibilities.' (Rottinghaus et al. 2005, p. 5)
Main empirical implementation	Savickas and Porfeli (2012)	McArdle et al. (2007)	Briscoe et al. (2006)	Rottinghaus et al. 2005
Focused on...				
...working adults	X	X	X	X
...adolescents	X			
Organisational/ Occupational commitment	potentially high	low	low	low
Ability to adapt				
- implicit	X			
- explicit		X	X	X
Identity as ...	... the second meta-competency of career construction ... an orientation function: the willingness to adapt. Mutually related to the ability to adapt.	... a second dimension of employability	... the second meta-competency/ orientation of the protean career (values driven)	... a validation criteria and key career-related outcome

Scale, Porfeli and Savickas (2012) assessed the relation of adaptability and vocational identity measured by the *Vocational Identity Status Assessment* (Porfeli et al. 2011), which is a refinement of Marcia's identity model (Marcia 1966). They found that career adaptability and vocational identity strongly relate to each other supporting the idea of these constructs 'as the two major meta-competencies in career construction' (Porfeli and Savickas 2012, p. 752). Following these operationalisations, Negru-Subtirica et al. (2015) found evidence for a positive reciprocal link between career adaptability and vocational identity in a longitudinal perspective. In their study, career adaptability positively predicted facets of students' vocational identity development such as vocational exploration and commitment. In turn, vocational commitment and other aspects of vocational identity predicted career adapt-abilities.

Negru-Subtirica et al. as well as Porfeli and Savickas draw on Marcia's model from a vast range of identity conceptualisations (Raeder and Grote 2007, p. 151), since they focus on the vocational orientation process before entering professional life conducting studies with adolescents. However, this approach is less suitable for apprentices who have already chosen the vocation they want to be trained in. As vocational education and training in Germany aims at apprentices developing strong vocational ties and getting integrated within their new working environment (Brown et al. 2007; Baethge et al. 2009a), it seems to be appropriate to view vocational identity as a central part of one's social identity. Consequently, according to social identity theory, one's social identity covers that part of the self-concept 'which derives from his knowledge of his membership of a social group (or groups) together with the value and emotional significance attached to that membership' (Tajfel 1978, S. 63). In this sense, identity is composed of several foci of identification, depending on their salience for the individual. In the field of initial vocational education within the German dual system, the distinction between occupation-related and workplace-related identity constructions appears to be fundamental (Klotz et al. 2014). In terms of social identity theory, the occupation he or she is trained for (occupational identification) and the company providing the training (organisational identification) has to be differentiated. Furthermore, both foci of identification can be subdivided into four dimensions commonly distinguished in empirical research on social identity theory: cognitive, affective, normative and behavioural identification (van Dick 2004). In the context of VET, the first two dimensions are of particular interest. Cognitive identification covers the awareness of one's group membership, whereas affective identification is conceived as the emotional value associated with that membership. The identification *as* a member of one's occupational or organisational group (*cognitive*) is seen as a necessary prerequisite of one's identification *with* this group (*affective*). This differentiation of foci and dimensions provides a useful view to investigate the relevant professional ties of apprentices in the dual system and their relationship with career adaptability.

Method

Aim and Hypotheses of the Study

The theoretical overview showed that the approaches of Fugate et al., Hall et al., and Rottinghaus et al. rather focus on the flexibility and adaptation demands working adults

are facing while Savickas' approach tends to be broader by also addressing the developmental tasks of adolescents and young adults at the beginning of their vocational career. Therefore, this approach seems to be valuable for investigating career adaptability during apprenticeships in vocational education. The four career adaptability dimensions appear to contain important resources for the vocational development of young adults who are starting their career with an apprenticeship and have to handle professional challenges for the first time. They cover the ability to act future oriented and responsible concerning one's apprenticeship as well as the openness and self-efficacy to explore and master novel work tasks. However, the application of Savickas' approach on adolescents and young adults has so far been largely limited to students who have not yet chosen a career. These students clearly differ in their vocational development status and adaptation demands compared to apprentices. Instead of preparing for their vocational choice, apprentices have to adapt to their new training environment. Hence, it needs to be empirically clarified whether the four dimensions of career adaptability proposed by Savickas can be separated among apprentices. As the CAAS proved adequate for investigating both students' and working adults' career adaptability, it should be suitable for apprentices in the German context as well. Therefore, it is hypothesised that Savickas' four-dimensional structure of career adaptability (the dimensions being concern, control, curiosity, confidence) can be replicated among commercial apprentices in the German dual system (**H1**).

Furthermore, the theoretical considerations raise the question whether the alternative conceptualisations of career adaptability are empirically different from Savickas' approach. Besides the broader scope of the CAAS outlined above, it is also the only scale that measures career adaptability multi-dimensionally. It is worth investigating to what extent the adaptability facets of apprentices covered by these different operationalisations overlap measuring the same aspects or whether they had to be regarded as separate constructs. Taking into account the conceptual differences, it is assumed that Savickas' operationalisation of career adaptability can be empirically discriminated against alternative approaches (of Hall et al., Fugate et al.) when investigating commercial apprentices in the dual system (**H2**).

As shown previously, (career) adaptability is often associated with a tendency of work-related flexibility or mobility as a rather disintegrative element on the one hand. On the other hand, it also contains an integrative potential by strengthening the vocational ties of young adults in terms of identity. Facing this contradiction, it is an open question whether career adaptability serves as an integrative or disintegrative factor among the particular group of apprentices' in the German dual system. By defining apprentices' vocational identity in terms of occupational and organisational identification, it is possible to assess whether career adaptability fosters the two crucial vocational ties of apprentices in the dual system. Besides, this approach allows to consider the effects of career adaptability on the cognitive (awareness of one's group membership) as well as the affective (emotional value of that membership) aspects of these ties separately. Based on the conceptual framework for empirical research in this context (e.g. Rudolph et al. 2017), vocational identity in terms of the apprentices' occupational and organisational identification can be viewed as an important adaptation result that is promoted by career adaptability resources. Hence, it is hypothesised that Savickas' four-dimensional operationalisation of career adaptability is positively related to commercial

apprentices' vocational identity in terms of their (cognitive and affective) occupational and organisational identification (**H3**).

Sample and Procedure

The questionnaire study was conducted in October 2018 at a vocational school in Germany. Participants completed a 45 min long (including instructions) paper-and-pencil questionnaire during class. The convenience sample included a total of 395 apprentices (59.7% females) from the commercial domain of the German dual system. Participants' age ranged from 16 to 39 with a mean age of 20.27 years ($SD = 3.12$). Participants were enrolled in four very common commercial apprenticeship programs in Germany (see Table 2, German names of vocations in brackets): Office Clerks (35.2%), Management/Sales assistant for retail services (23.5%), Automobile business administrator (24.8%) and Freight forwarding and logistics services clerk (15.9%). They were distributed over the years of apprenticeship as follows: first year (42.5%), second year (34.2%) and third year (22.5%). All apprentices participated voluntarily and provided written consent.

Measures

Savickas' conceptualisation of career adaptability was measured using the German version of the Career Adapt-Abilities Scale (Johnston et al. 2013a). It consists of 24 items assigned to four subscales measuring *concern*, *control*, *curiosity* and *confidence*. In this initial validation of the German CAAS version by Johnston et al., the use of item parcelling led to a significant improvement in model fit. In line with previous research based on the common conceptual framework (Hirschi et al. 2015; Hirschi and Valero 2015), adaptivity as the trait-like basis and main antecedent of career adaptability was measured using proactivity as a proxy (Frese et al. 1997). Consequently, McArdle and colleagues' operationalisation of personal adaptability (as proactivity) was not included in the study.

Career adaptability, according to Rottinghaus and colleagues, was measured by using the German version of the Career Futures Inventory by Spurk and Volmer (2013), who excluded three items of the original scale (Rottinghaus et al. 2005) because

Table 2 Participants

Apprenticeship program	Year of apprenticeship			
	1.	2.	3.	Σ
Office Clerks (<i>Kaufmann/-frau für Büromanagement</i>)	52	47	40	139
Management/Sales assistant for retail services (<i>Einzelhandelskaufmann/-frau, Verkäufer/in</i>)	45	33	16	94
Automobile business administrator (<i>Automobilkaufmann/-frau</i>)	39	31	29	99
Freight forwarding and logistics services clerk (<i>Kaufmann für Spedition und Logistikdienstleistung</i>)	33	24	6	63
Σ	168	135	89	395

of low factor loadings. Due to lack of suitability for a sample of apprentices in the German dual system, two additional items were excluded (see Table 3), resulting in a six-item scale (CA-CFI) (For reasons of readability and clarity career adaptability measured as part of the Career Future's Inventory is referred to as CA-CFI in the following chapters.) ($\alpha = .86$). Self-directed career management, as successor of adaptability in the theorisation of the protean career by Hall and colleagues (Briscoe et al. 2006), was measured using the German version provided by Gasteiger (2007). Three items were excluded as they specifically address experiences of working adults, leading to a five-item scale (SDCMS) (For reasons of readability and clarity the Self-Directed Career Management Scale is referred to as SDCMS in the following chapters.) ($\alpha = .82$).

Vocational identity has been operationalised as occupational and organisational identification. Both foci of identification were measured by scales especially developed for the use among apprentices (Metzlaff 2014) drawing on scales theoretically rooted in social identity theory (Van Dick 2004; Van Dick et al. 2004). For each focus of identification, two adopted subscales were used. The cognitive identification scales consisted of four items (e.g. 'I am aware that I am a member of my occupational group/training company'; occupational: $\alpha = .90$; organisational: $\alpha = .90$). The affective identification scales included five items (e.g. 'I enjoy working in my occupation/training company'; occupational: $\alpha = .94$; organisational: $\alpha = .93$). Participants were asked to respond to all items using a scale from 1 (*does apply*) to 6 (*does not apply*).

^aSee chapter 4.1 and 5.

Statistical Analyses

The analyses were performed in Mplus Version 8.2 using robust maximum likelihood estimation (MLR; Kline 2015; Kleinke et al. 2017). When testing H1 and H2, confirmatory factor analysis was used. Additionally, when testing H2, a model comparison utilising the Satorra-Bentler scaled χ^2 -difference test (Hirschi et al. 2015; Kleinke et al. 2017) was performed. For further examination of discriminant validity, the Fornell-Larcker criterion was employed. In order to test H3, two structural equation models were calculated. For all analyses, model fit was assessed taking into account several fit indices simultaneously (Brown 2015; Kline 2015; Reinecke 2014): Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR). Values close to or above .95 for CFI and TLI indicate a good model fit (Hu and Bentler 1999). For RMSEA and SRMR values below .05 are considered good and values below .08 are considered acceptable (Kleinke et al. 2017).

Results

Replication of Career Adaptability among Apprentices

The confirmatory factor analysis which was used to replicate the CAAS among apprentices in the dual system (H1) revealed the limited suitability of some items. Due to their very low squared factor loadings (significantly below .30), three of the 24 original CAAS items (see Table 3) were excluded for the following analyses.

Table 3 Overview of constructs, scales & items

Construct	Authors	Scale, items & reliability
Adaptivity	Frese et al. (1997)	Personal initiative questionnaire: 6 items ($\alpha = .75$) Example item: 'I actively attack problems.'
Career Adaptability (CA-CFI)	Rottinghaus et al. (2005) German version: Spurk and Volmer (2013)	Subscale of the Career Futures Inventory: 6 items ($\alpha = .86$) Example item: 'I can adapt to change in the world of work.'
Excluded Items (in advance): expected lack of suitability for apprentices (dual system)/ rather appropriate for working adults		'I tend to bounce back when my career plans don't work out quite right.' 'Others would say that I am adaptable to change in my career plans.'
Self-directed career management (SDCMS)	Briscoe et al. (2006) German version: Gasteiger (2007)	Self-directed career management Scale: 5 items ($\alpha = .82$) Example item: 'I am in charge of my own career.'
Excluded Items (in advance): expected lack of suitability for apprentices (dual system)/ rather appropriate for working adults		'When development opportunities have not been offered by my company, I've sought them out on my own.' 'In the past I have relied more on myself than others to find a new job when necessary.' 'Overall, I have a very independent, self-directed career.'
Career Adaptability (CAAS)	Savickas and Porfeli (2012) German version: Johnston et al. (2013)	Career Adapt-Abilities Scale: 24 original items, 6 items per sub-dimension 21 items included: Example items: 'I am good at ...' Concern ($\alpha = .84$), '... preparing for the future.' Control ($\alpha = .78$), '... taking responsibility for my actions.' Curiosity ($\alpha = .73$), '... looking for opportunities to grow as a person.' Confidence ($\alpha = .83$), '... overcoming obstacles.' Item parcelling: 2 items per parcel, correlational method.

Table 3 (continued)

Construct	Authors	Scale, items & reliability
Excluded Items (after initial examination): very low squared factor loadings (<.30) and theoretical reasons ^a		
Vocational identity		
Cognitive identification	Van Dick et al. 2004 German version: Metzlaff (2015)	<i>'Realizing that today's choices shape my future.'</i> (concern) <i>'Investigating options before making a choice.'</i> (curiosity) <i>'Exploring my surroundings.'</i> (curiosity)
Affective identification		Occupational: 4 Items ($\alpha = .90$), organisational: 4 Items ($\alpha = .90$). Example item: 'I identify myself as a member of my occupation/ training occupation.' Occupational: 5 Items ($\alpha = .94$), organisational: 5 Items ($\alpha = .93$). Example item: 'I like to work in my occupation/ for my training company.'

The initial four-factor model (including 21 items) with career adaptability as a higher-order latent construct did not show a good fit with the data (Basic Model, see Table 4). Especially the values for CFI (.902) and TLI (.889) are considerably below the cut-off lines outlined above. The standardised loadings of the items on their respective factor ranged from .54 to .82. The standardised loadings of the factors on the higher-order construct of career adaptability ranged from .78 to .96. All of these loadings are significantly different from zero ($p < .001$).

In line with Johnston, Johnston et al. (2013a) and Johnston et al. (2013b), another model was tested using item parcelling (Johnston, Luciano, Maggiori, Ruch, and Rossier (2013) used item parcelling as an adequate method to ‘increase stability of parameter estimates, improve the variable-to-sample-size ratio, increase the proportion of common variance relative to unique variance, and obtain a more continuous and normal distribution’ (p. 4). Compared to alternative parcelling techniques, the correlational method of item parcelling is superior in terms of accurate parameter estimation and sensitivity to model misspecification (ibid, p.8; Rogers and Schmitt 2004). Following this, Johnston, Broonen, Stauffer, Hamtiaux, Pouyaud, Zecca et al. (2013) employed the same approach for the validation of the German version of the CAAS.) (Bandalos 2002; Rogers and Schmitt 2004; Coffman and MacCallum 2005). Utilising the correlational method, the items within each factor were paired according to their degree of correlation with each other. (The two items with the highest correlation were assigned to the first parcel, the two items with the next highest correlation were assigned to the second parcel and the remaining two items build the third parcel. Then the mean score of both items is used in the actual analysis (Rogers and Schmitt 2004; Coffman and MacCallum 2005). Due to the three excluded items, this results in only two pairs for the factor *curiosity* and two pairs and one single item for the factor *concern*.) Similar to the studies mentioned before, this modification provided a good model fit (Item Parcelling Model, see Table 4). Especially the values for CFI (.967), TLI (.954) and SRMR (.036) improve significantly while the value for RMSEA (.056) is only slightly improved. The standardised parcel weights ranged from .67 to .90 and the standardised loadings of the factors on the higher-order construct of career adaptability ranged from .76 to .96. These loadings are also significantly different from zero ($p < .001$).

Discrimination of Different Empirical Operationalisations of Career Adaptability

To discriminate the CAAS against alternative operationalisations of career adaptability, several models (see Fig. 1) were tested and compared using the Satorra-Bentler

Table 4 Replication of CAAS

Model (using Mplus MLR)	χ^2	df	p	CFI	TLI	RMSEA (90% C.I.)	SRMR
Basic Model CAAS (21 Items)	406.022	185	<.001	.902	.889	.057 (.050/.065)	.052
Item Parcelling Model CAAS (21 Items + IP)	84.751	40	<.001	.967	.954	.056 (.039 /.072)	.036

Model 1a/b:

Model 2a/b:

Fig. 1 Illustration of model comparison (Model 1a/2a: Separation of CAAS and CA-CFI; Model 1b/2b: Separation of CAAS and SDCMS. Model 1a/b: All items loading on one factor; Model 2a/b: Items loading on separate factors.)

corrected significance test. Additionally, the Fornell-Larcker criterion was employed to test for discriminant validity.

The first model comparison assesses the separation of the CAAS and the adopted career adaptability scale of the *Career Futures Inventory* (CA-CFI). For Model 1a a one-factor structure combining both scales (all items loading on one factor) was tested providing a poor fit with the data (see Table 5; CFI = .810, TLI = .783, RMSEA = .097, SRMR: .075). Model 2a contains both operationalisations as separate constructs (the CAAS items loading on their corresponding factor and the four factors loading on a higher-order latent construct). The model fit for Model 2a nearly reached the common cut-off values (CFI = .943, TLI = .932, RMSEA = .054, SRMR: .046). The same procedure was performed for the CAAS and the adopted *Self-Directed Career Management Scale* (SDCMS). This results in an even worse model fit for the one-factor Model 1b combining the CAAS and the SDCMS scale (CFI = .751, TLI = .712, RMSEA = .111, SRMR = .096). Model 2b with CAAS and SDCMS as separate constructs shows an acceptable model fit (Model 2b: CFI = .952, TLI = .942, RMSEA = .050, SRMR = .051).

As shown, the analyses indicate improved fit values for the models with separate constructs in both cases. To provide stronger evidence that the CAAS and the CA-CFI or SDCMS actually measure distinct constructs, the Satorra-Bentler scaled χ^2 difference test was conducted (Kleinke et al. 2017, p. 47/48). It turns out that model 2a (SB-corrected $\Delta\chi^2 = 203.566$, $\Delta\text{-df} = 5$, $p < .001$) as well as model 2b (SB-corrected $\Delta\chi^2 = 209.352$, $\Delta\text{-df} = 5$, $p < .001$) provide significantly better model fit than their respective one-factor models (model 1a/1b).

As the model fit, especially for the separation of the CAAS and the CA-CFI, is rather moderate, the Fornell-Larcker criterion was used for a further examination of potential overlaps between the different operationalisations. To provide evidence for

Table 5 Model comparison

Model (using Mplus MLR)	χ^2	df	p	CFI	TLI	RMSEA (90% C.I.)	SRMR
Model 1a: 1-factor structure (CAAS + CA-CFI)	524.795	119	<.001	.810	.783	.097 (.089/.106)	.075
Model 2a: Separate constructs (CAAS) – (CA-CFI)	235.839	114	<.001	.943	.932	.054 (.044/.064)	.046
Model 1b: 1-factor structure (CAAS + SDCMS)	567.695	104	<.001	.751	.712	.111 (.102/.120)	.096
Model 2b: Separate constructs (CAAS) – (SDCMS)	187.992	99	<.001	.952	.942	.050 (.039/.061)	.051

CFI Comparative Fit Index

CA-CFI Career adaptability as a subscale of the Career Futures Inventory (Rottinghaus et al. 2005)

discriminant validity, the average variance extracted (AVE) for both constructs should have a greater value than the square correlation of the supposedly separate constructs. This criterion is met for the discrimination of the CAAS and the SDCMS ($AVE_{CAAS} = .822$; $AVE_{SDCMS} = .511$; $r^2 = .266$). For the separation of the CAAS and the CA-CFI however, the square correlation ($r^2 = .573$) is higher than the average variance extracted for the CA-CFI ($AVE_{CA-CFI} = .509$; $AVE_{CAAS} = .816$). This clarifies that the CAAS could only be discriminated against the SDCMS. In contrast, the degree of overlap between the CAAS and the CA-CFI does not justify a clear distinction between two separate constructs.

A more detailed view shows that this overlap can be traced back to specific aspects of the CAAS. Applying the Fornell-Larcker criterion on the level of the 4 Cs, the dimension of *concern* ($AVE_{concern} = .592$; $AVE_{CA-CFI} = .509$; $r^2 = .239$) could be clearly separated from the CA-CFI. *Curiosity* barely meets the criterion ($AVE_{curiosity} = .573$; $AVE_{CA-CFI} = .509$; $r^2 = .472$) whereas *control* ($AVE_{control} = .504$; $AVE_{CA-CFI} = .509$; $r^2 = .536$) and *confidence* ($AVE_{confidence} = .585$; $AVE_{CA-CFI} = .509$; $r^2 = .578$) both miss the criterion because of their relatively high correlation to CA-CFI. This shows that the overlap between the CAAS and the CA-CFI is primarily due to the dimensions of *control* and *confidence*.

Relationship between Career Adaptability and Vocational Identity

To assess the relationship between career adaptability measured by the CAAS and vocational identity (operationalised as occupational and organisational identification), two structural equation models were tested. Whereas adaptivity is conceived as an antecedent of career adaptability, occupational and organisational identification are considered as important career related outcomes and are therefore viewed as adaptation results within the given framework. The first focus of interest is on the association of the apprentices' career adaptability and their awareness of belonging to their occupational and organisational group (Model 1: cognitive identification). Model 1 (see Fig. 2)

Fig. 2 Model 1: cognitive identification (Occ_cog = occupational cognitive identification (i74 to i89); org_cog = organisational cognitive identification (i95 to i111); conc/cont/cur/conf1/2/3 = item parcels; i17 to i32 = Adaptivity items.)

provided good model fit ($SB-\chi^2 = 427.163$, $df = 267$, $CFI = .956$, $TLI = .951$, $RMSEA = .041$, $SRMR = .058$). There is a high significant positive effect of adaptivity on career adaptability ($B = 0.812$, $SE = 0.037$, $p < .001$) confirming theoretical assumptions. The positive effects of career adaptability on cognitive occupational identification (occ_cog; $B = 0.410$, $SE = 0.058$, $p < .001$; $R^2_{occ_cog} = .168$) and cognitive organisational identification (org_cog; $B = 0.276$, $SE = 0.065$, $p < .001$; $R^2_{org_cog} = .076$) are also significant. Both foci of cognitive identification highly correlate with each other ($r = 0.664$, $SE = 0.051$, $p < .001$) indicating that the awareness of belonging to one's occupational group closely relates to the awareness of one's organisational group membership.

Furthermore, the relationship between the apprentices' career adaptability and their emotional attachment (affective identification) to their occupational and organisational group was investigated. Analogously to the previous procedure, a structural equation model (Model 2) was tested, this time with affective occupational and organisational identification as adaptation results. Model 2 (see Fig. 3) also obtained good model fit ($SB-\chi^2 = 567.654$, $df = 316$, $CFI = .949$, $TLI = .943$, $RMSEA = .047$, $SRMR = .054$). The positive effect of adaptivity on career adaptability remains almost identical to Model 1 ($B = 0.815$, $SE = 0.037$, $p < .001$). The positive effects of career adaptability on affective occupational identification (occ_aff; $B = 0.363$, $SE = 0.058$, $p < .001$; $R^2_{occ_aff} = .132$) and affective organisational identification (org_aff; $B = 0.216$, $SE = 0.062$, $p = .001$; $R^2_{org_aff} = .047$) are also quite similar to the effects on cognitive identification. The correlation between both affective foci of identification is even higher than in Model 1 ($r = 0.784$, $SE = 0.039$, $p < .001$).

Discussion

This study focused on three main aims: the replication of the CAAS among commercial apprentices in the dual system (H1), its discrimination against alternative

Fig. 3 Model 2: affective identification (Occ_aff = occupational affective identification (i79 to i93); org_aff = organisational affective identification (i99 to i113); conc/cont/cur/conf1/2/3 = item parcels; i17 to i32 = Adaptivity items.)

operationalisations of career adaptability (H2) and the analysis of the relation between career adaptability and vocational identity as a key career-related outcome of VET (H3). Concerning the first aim, the four-dimensional operationalisation of career adaptability by Savickas could be largely replicated in the dual system. Initially, the four-factor model did not show a good fit with the data. However, the values of the fit-indices are comparable to previous studies using the German version of the CAAS (Johnston, Broonen, Stauffer, Hamtiaux, Pouyaud, Zecca et al. 2013; Hirschi and Valero 2015). Analogous to the original validation of the German CAAS version (Johnston, Broonen, Stauffer, Hamtiaux, Pouyaud, Zecca et al. 2013), item parcelling led to significantly improved fit-indices and an overall good model fit. These results confirm that the four sub-dimensions covered by the CAAS can also be found among commercial apprentices in the dual system and that their career adaptability can be seen as a higher-order latent construct formed by these sub-dimensions. Despite the different adaptation demands apprentices are facing compared to students and working adults, similar facets of career adaptability are present throughout all of these groups. Although the importance and characteristics of the four career adaptability dimensions may vary regarding the particular development task, the findings provide further support for their generalisability regardless of one's vocational development status.

Furthermore, Savickas' operationalisation of career adaptability could be empirically discriminated against the *Self-Directed Career Management Scale*. Although *self-directed* is defined as 'having the ability to be adaptive in terms of performance and learning demands' (Briscoe and Hall 2006 p. 8), this indicates that the SDCMS and CAAS by Savickas seem to cover different (yet related) constructs. This is plausible as the SDCMS is a result of the further development of Hall's initial theorisation of the protean career (see chapter 2.2). Despite this conceptual proximity, the additional emphasis on self-directedness can be held responsible for the empirical gap between both operationalisations. Therefore, they should not be treated as synonyms and

researchers should be cautious in generalising empirical results obtained by using one of these constructs. Moreover, the theoretical framework these constructs are embedded in should be taken into account, before precisely choosing the appropriate operationalisation to investigate and draw conclusions from (Johnston 2016).

In contrast, Savickas' operationalisation of career adaptability could not be clearly discriminated against career adaptability measured by the *Career Futures Inventory*. This finding is in line with the aim of Rottinghaus et al. to find a measure for Savickas' early conceptualisation of career adaptability (1997). Nevertheless, it contradicts the expectations because of the different ways of operationalising career adaptability as pointed out in chapter 2.2. Rottinghaus et al. refer to the individual's self-assessed capacity to adapt to changing conditions regarding one's work environment and career. Compared to this, Savickas does not address adapting to change in the CAAS explicitly, but rather draws on the crucial individual resources for being adaptable. However, the second order latent variable of career adaptability formed by these four dimensions (*concern, control, curiosity, confidence*) seems to be closely related to the construct measured by the Scale of Rottinghaus and colleagues. A more detailed examination of the overlapping aspects between both operationalisations revealed that this can be mainly traced back to the dimensions of *control* and *confidence*. This means that the CAAS and the CA-CFI include corresponding aspects concerning the apprentices' internal locus of control in terms of one's career and their vocational self-efficacy. On the other hand, a career-related future orientation (*concern*) or the exploration of vocational opportunities (*curiosity*) is not covered by the scale of Rottinghaus and colleagues. This points out that, despite lack of empirical distinctiveness in relation to the CAAS, the CA-CFI does not contain essential aspects of career adaptability, particularly *concern*, which Savickas considers to be the most important dimension. Given the considerations laid out before, it could be assumed that these findings are not limited to the sample of commercial apprentices. Career adaptability and vocational identity is positively related among commercial apprentices. More precisely, career adaptability operationalised as a higher-order construct consisting of the four sub-dimensions of *concern, control, curiosity* and *confidence* positively predicts the apprentices' occupational and organisational identification in a cognitive and affective manner. According to this, career adaptability on the one hand supports the apprentices' degree of identification as a member of his or her occupational as well as organisational group. Building upon this cognitive self-categorisation, career adaptability on the other hand fosters the extent to which the apprentices identify *with* their occupational and organisational group, covering the emotional significance of their respective group membership. In comparison of the two foci of identification, the R^2 values indicate that career adaptability seems to be more relevant for occupational identification than for organisational identification. Nevertheless, the findings of this study point out the importance of all four resources of career adaptability in the process of apprentices initially entering the world of work and facing novel challenges. With higher career adaptability, the commercial apprentices undergoing initial vocational training are more likely to proactively think about future career goals and to anticipate their further career path while completing their apprenticeship (*concern*). Developing an internal locus of control and taking responsibility for their own career lead to deliberate career related decisions (*control*). By actively exploring relevant work-related situations and tasks beyond their mandatory training curriculum, they construct a better understanding of

possible work roles and seize opportunities within their chosen occupation and company (*curiosity*). As the apprenticeship is usually the apprentices' first encounter of the working world, maintaining confidence and self-efficacy throughout inevitable difficulties and uncertainties is crucial in order to grow with these challenges (*confidence*). To foster career adaptability resources of commercial apprentices, training curricula should allow for exploring (*curiosity*) a broad range of challenging (*confidence*) work roles within a chosen occupation. Furthermore, variable elements of the training programme should encourage apprentices to face their future opportunities (*concern*) and engage in self-determined decision making (*control*). Overall, the results not only show that apprentices' adaptivity largely predicts their career adaptability, but also provide evidence that career adaptability itself is a positive predictor of their cognitive and affective identification. This is true for both the apprentices' occupational as well as their organisational identification. Therefore, the career adaptability of commercial apprentices relates positively to both aspects of their vocational identity confirming the theorisation of adaptability and identity as the two crucial and interrelated constructs of modern career development (Savickas 2011).

One important result concerning the replication among apprentices is the exclusion of three items of the original CAAS due to empirical and theoretical considerations. Besides their very low squared factor loadings (see Table 3), questions regarding content validity support this proceeding. The excluded items have proven to be suitable for university students (Hirschi and Valero 2015) as well as working adults (Johnston, Broonen, Stauffer, Hamtiaux, Pouyaud, Zecca et al. 2013) but appear to be inappropriate for apprentices within the dual system and their particular developmental status. These items emphasise the need for a broad exploration facing an upcoming vocational decision, not taking into account the apprentices' specific situation. They have already made an initial vocational choice, therefore exploration and decision making are not relevant in the same way as it is for other groups. Exploring and investigating one's environment in order to prepare for a crucial vocational choice usually only regains importance facing the end of one's apprenticeship. Low scores on this category may indicate sufficient exploration and 'a good fit' in the first place. A reformulation of these items for apprentices in a more general manner (as most other items of *curiosity* and *concern*) or with an emphasis on in-depth exploration (with respect to orientation within their apprenticeship and its career possibilities) may be worth considering. In order to maintain coherence and comparability towards empirical research in this field, the problematic items were excluded in this study.

Besides, there are some general limitations. First, the survey took place at only one school. The results of the replication of the CAAS (German version) among commercial apprentices are pretty similar to previous studies using this scale (Johnston, Broonen, Stauffer, Hamtiaux, Pouyaud, Zecca et al. 2013; Hirschi and Valero 2015). The initial fit values for the confirmatory factor analysis as well as the improvement through item parcelling were comparable to these studies. In this respect, there is no evidence that this limitation had a detrimental effect. Another possible constraint is the heterogeneous sample consisting of apprentices from different occupations and years of apprenticeship. Although all examined occupations share some similarity as they belong to the commercial domain of the German dual system of VET, it cannot be ruled out that occupation-specific effects play a significant role regarding the importance of career adaptability. For a deeper analysis of the patterns of vocational

development within a particular occupation, occupation-specific context effects have to be taken into account. As the main focus of this study was an initial investigation of career adaptability among apprentices within the German dual system in general, it seemed more adequate to choose a sample that is homogeneous regarding the domain (commercial vs. technical), but diverse by including different occupations within this domain. Furthermore, the given research focus preferred an overall view on the relevance of career adaptability for commercial apprentices without considering status-specific characteristics. In this respect, it should be noted that over 40% of the sample were learners in the first year of apprenticeship and only about 23% were in the third year. The four career adaptability resources may vary in their relevance depending on the apprentices' individual developmental status. *Curiosity*, for example, may play a different role for apprentices reorienting themselves at the beginning of their apprenticeship than for apprentices just completing their training. In addition, more experienced learners with already completed training paths could display diverse characteristics regarding their adaptability development. Therefore, a more detailed analysis could shed light on these diverse and in some cases even contrary effects of career adaptability on apprentices' vocational development and professional identification. This requires putting a stronger emphasis on viewing the four adaptability resources and their effects on relevant outcomes separately.

Despite these limitations, the results confirm the four-dimensional structure of career adaptability among commercial apprentices. Furthermore, the empirical findings and theoretical considerations support the assumption that career adaptability should be seen as a beneficial element for VET fostering the development of occupational and organisational ties instead of leading to its dissolution. Thus, within the specific context of the dual system of VET, career adaptability can be conceived as a desirable characteristic of apprentices completing their training. Therefore, developing apprentices' career adaptability deserves more attention, not by promoting it at a general level, but rather by drawing on the four sub-dimensions proposed by Savickas. Further research on this issue should consider the reciprocal interrelation of adaptability and identity. To deepen the understanding of their mutually interrelatedness, longitudinal studies should be taken into account. This addresses the question to what extent apprentices' career adaptability can actually be regarded as an antecedent of their identity development and vice versa. The findings of this study contradict the disintegrative perception of adaptability as solely flexibility-oriented and associated with a vocational mobility preference, as partly suggested by referring to a protean or boundaryless mindset. This integrative property of career adaptability, however, may especially apply to apprentices and their particular vocational situation. For working adults, career adaptability just as well provides the resources to address necessary changes in one's career, finally leading to organizational or even occupational turnover.

Conclusion

Overall, the findings contribute to a better conceptual clarification within the empirical research on career adaptability in general. It could be shown that career adaptability operationalised by the CAAS is empirically different from the construct measured by the SDCMS. Therefore, it is crucial to choose the appropriate measure for a given

research question and to be cautious in drawing conclusions from one construct to another. In contrast, career adaptability operationalised by the CAAS could not be empirically discriminated against the alternative operationalisation of the CA-CFI. This is largely because both scales overlap regarding aspects like vocational self-efficacy and internal locus of control.

As a main contribution, the replication of the CAAS for the area of VET and its investigation in relation to commercial apprentices' vocational identity helps to foster a core construct of vocational development. The findings confirm the positive effect of career adaptability on vocational learning as a process of identity development at work. This development of one's vocational identity is – besides the development of expertise – a central aim of vocational education in Germany.

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