



The Career Decision-Making Adaptability Score: Exploration and validation of its predictive power for subjective and objective career success

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Abstract

The study aims at validating the Career Decision-Making Adaptability Score (CDA Score) by investigating its predictive influence on objective and subjective career success, career adaptability, and psychological well-being over a 1-year period. Furthermore, the predictive influence of additional career decision-making strategies was scrutinized. Regression analyses of data from 78 employed individuals from two measurement time points demonstrated that the CDA Score predicts yet unexplored variables (e.g., psychological well-being) and *consulting with others* contributes to career adaptability and satisfaction. The findings extend research on career decision-making, validate the CDA Score longitudinally, and offer directions for the design of career counseling services.

Keywords Career decision-making · CDMP · Career success

Résumé

Le score d'adaptabilité à la prise de décision de carrière : Exploration et validation de son pouvoir prédictif sur le succès de carrière subjectif et objectif La présente étude vise à valider le Career Decision-Making Adaptability Score (CDA Score) en examinant son influence prédictive sur le succès de carrière objectif et subjectif, l'adaptabilité de carrière et le bien-être psychologique sur une période d'un an. En outre, l'influence prédictive d'autres stratégies de prise de décision de carrière a été examinée. Les analyses de régression des données de 78 personnes en emploi, effectuées à partir de deux points de mesure, ont démontré que le score de CDA prédit des variables encore inexplorées (par exemple, le bien-être psychologique) et que la consultation d'autres personnes contribue à l'adaptabilité et à la satisfaction de carrière. Ces résultats élargissent la recherche sur la prise de décision en matière de

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carrière, valident le score CDA de manière longitudinale et offrent des perspectives pour la conception de services d'orientation professionnelle.

Zusammenfassung

Der Career Decision-Making Adaptability Score: Erforschung und Validierung seiner Vorhersagekraft für subjektiven und objektiven beruflichen Erfolg

Ziel der Studie ist es, den Career Decision-Making Adaptability Score (CDA Score) zu validieren, indem sein prädiktiver Einfluss auf objektiven und subjektiven beruflichen Erfolg, berufliche Anpassungsfähigkeit und das psychische Wohlbefinden über einen Zeitraum von einem Jahr untersucht wird. Darüber hinaus wurde der prädiktive Einfluss zusätzlicher beruflicher Entscheidungsstrategien untersucht. Regressionsanalysen der Daten von 78 erwerbstätigen Personen aus zwei Messzeitpunkten zeigten, dass der CDA-Score bisher nicht berücksichtigte Variablen (z. B. psychologisches Wohlbefinden) vorhersagt und dass die Beratung mit anderen zur beruflichen Anpassungsfähigkeit und Zufriedenheit beiträgt. Die Ergebnisse erweitern die Forschung zur beruflichen Entscheidungsfindung, validieren den CDA-Score im Längsschnitt und geben Hinweise für die Gestaltung von Berufsberatungsangeboten.

Resumen

El puntaje de adaptabilidad para la toma de decisiones de carrera: Exploración y validación de su poder predictivo para el éxito profesional subjetivo y objetivo

El estudio tiene como objetivo validar el Puntaje de Adaptabilidad para la Toma de Decisiones de Carrera (CDA Score) mediante la investigación de su influencia predictiva en el éxito profesional objetivo y subjetivo, la adaptabilidad profesional y el bienestar psicológico durante un período de un año. Además, se examinó la influencia predictiva de estrategias adicionales de toma de decisiones de carrera. Los análisis de regresión de los datos de 78 individuos empleados de dos puntos de tiempo de medición demostraron que el CDA Score predice variables aún inexploradas (por ejemplo, bienestar psicológico) y consultar con otros contribuye a la adaptabilidad y satisfacción profesional. Los hallazgos amplían la investigación sobre la toma de decisiones profesionales, validan longitudinalmente el puntaje CDA y ofrecen instrucciones para el diseño de servicios de asesoramiento profesional.

Introduction

As “prophesized” about 25 years ago, when the new logic of the ‘boundaryless career’ was introduced (Arthur, 1994; Mirvis & Hall, 1994), employees nowadays find themselves in a career context which provides recurring phases of deciding between different career options. Especially in the year 2020, the Corona crisis has shown in an unprecedented way that linear and secure careers no longer correspond to the employment reality of employees. Rather, circumstances required employees to adapt very suddenly to changed employment situations. This extreme economic uncertainty and the corresponding insecure career situation (cf. Akkermans et al., 2020) reflect, albeit with unpredictable suddenness and intensity, the current

conditions on the labor markets, which continuously force employees to determine and evaluate career opportunities and to decide between them.

Career decision-making is an area that has inspired decades of research. In particular, individuals' career decision-making strategies are a well-established area within career research (Byington et al., 2019). They reflect the habitual response patterns of individuals when faced with career decisions (Scott & Bruce, 1995). Fundamentally, when deciding between different career options, individuals can apply a variety of decision-making strategies (Singh & Greenhaus, 2004). Likewise, the notion that career decision-making behavior is multidimensional is established in the literature (Gadassi et al., 2012; Ginevra et al., 2012). In line with this thinking, Gati et al. introduced the Career Decision-Making Profile (CDMP; Gati et al., 2010) consisting of twelve subscales reflecting twelve distinct career decision-making strategies (for example, comprehensive vs. minimal *information gathering*, high vs. low *procrastination*, or high vs. low *willingness to compromise*; cf. Gati & Levin, 2012, p. 391). The construction of the instrument was intended to comprehensively represent the range of career decision-making strategies that individuals can draw upon to respond to career-decisions. This made it possible to avoid the limitations of the previously prevalent single-most-dominant trait approach, but instead fully representing individual differences in career decision-making processes (Gati et al., 2010).

In previous research, six decision-making strategies were claimed to be particularly adaptive for the decision-making process and combined into a composite measure, the *Career Decision-Making Adaptability Score* (CDA Score; Gati & Levin, 2012). The CDA Score is made up of six CDMP subscales (*information gathering*, *locus of control*, *procrastination*, *speed of making the final decision*, *dependence on others*, and *desire to please others*). Specifically, a comprehensive search for information, a high internal locus of control, little procrastination, a high speed of decision-making, a low dependence on other persons, and a low degree of the desire to please others were considered more adaptive on the basis of theoretical considerations and initial empirical findings (cf. Gati & Levin, 2012). The extent of using these six strategies indicates the degree to which individuals have narrowed down the range of occupational alternatives under consideration (Gadassi et al., 2012, p. 5), and exhibits negative correlations with career decision-making difficulties, which is why the authors cited concluded that these six strategies with their corresponding poles were of particular importance to the career decision-making process.

The particular adaptability of these six strategies to the career decision-making process is widely accepted (Gati & Levin, 2012). In addition, first empirical evidence suggests that the strategies combined in the CDA Score might also have an influence on whether individuals experience their careers as subjectively or objectively successful. By way of example Ebner et al. (2018) showed that a high *speed* at which career choices are made and an internal *locus of control* relate positively with occupational optimism and career adaptability (Ebner et al., 2018). Furthermore, Gadassi et al. (2012) found that people who decide quickly and without delay (high *speed of making the final decision*, little *procrastination*) and autonomously (little *dependence on others*, low *desire to please others*) have fewer difficulties with their vocational identity. However, methodological weaknesses especially with

regard to the cross-sectional nature of the analyzed data might limit the validity of these findings.

To unveil the predictive power of the career decision-making strategies combined within the CDA Score on careers, data at more than one time point are needed. In this sense, previous research must be complemented by offering empirical support for the assumption that the CDA Score predicts career success and psychological well-being over time. Additionally, the idea that career decision-making strategies not included within the CDA Score influence individuals' careers in specific and unique ways, has not been fully investigated. However, there is empirical evidence that strategies not yet included in the CDA Score also have importance for individuals' careers. For example, a strong *aspiration for an ideal occupation* negatively correlates with career decision-making difficulties (Gadassi et al., 2012). Differences in decision status are reflected in the extent to which individuals are meticulous in processing information, make efforts in coming to a decision, and consult with others while elaborating on a decision (Gadassi et al., 2012). More fundamentally, empirical findings from the career literature make correlations with career success variables more than likely.

Hence our intention to additionally investigate whether the current version of the CDA Score should be expanded by further decision-making strategies to maximize information about its adaptivity for individuals' longer-term career success and well-being. In pursuing these two questions, we are turning away from the prevailing tradition of considering the influence of career decision-making strategies on outcome measures that are related to the career-decision process itself (e.g. career-decision self-efficacy). At the same time, we broaden the view required for this purpose and consider outcome measures that are actually related to individuals' careers (i.e. objective and subjective career success).

By finding answers to the aforementioned questions, the study contributes to the literature on career-decision making by investigating whether career decision-making strategies predict different types of subjective and objective career success over time, and to the practice of career counseling, which strongly relies both, practically and theoretically, on valid knowledge about clients' career decision-making behaviors. The relevance of these questions arises from the current situation in the labor markets in which an unexpected pandemic has turned the careers of many people upside down.

The contribution of the Career Decision-Making Adaptability Score (CDA Score) to objective and subjective career success

One of the most prominent topics in career research is the search for factors that contribute to career success (cf. Judge et al., 1995; Ng et al., 2005). However, a significant part of the variance in career success has yet to be explained. In addition to the previously identified aspects (e.g. sociodemographic factors, personality, social and human capital) it seems reasonable to more strongly consider individuals' behavior, which can be modified by interventions such as training and counseling.

Among the behavioral factors that are considered crucial for career success, career-planning behavior is particularly important (Ng et al., 2005). One important aspect of career planning is the way individuals approach their career decisions (Ebner et al., 2018; Gati et al., 2010). This type of self-directed career self-management is among the behaviors which are discussed as key promoters of career success (Hirschi et al., 2018). Prominent examples of self-directed career management behaviors are the extent of social resources utilized, the amount of information collected on, for example, careers or job opportunities, or the level of involvement in career management and decision-making. All of these show significant and sometimes considerable correlations with both, subjective and objective career success indicators (cf. Hirschi et al., 2018), and are discussed as essential components of individuals' career decision-making behavior.

Based on the idea that career decision-making strategies represent a specific form of self-directed career management with corresponding consequences for objective and subjective career success, there are good reasons to explore whether and which career decision-making strategies are particularly adaptive for individuals' careers. The six strategies that were already identified as particularly adaptive for the career-decision making process are information gathering (comprehensive), locus of control (internal), procrastination (little), speed of making the final decision (high), dependence on others (low), and desire to please others (little). Combined into the CDA Score, they were demonstrated to negatively relate to career decision-making difficulties, while positively relating with occupational self-efficacy, proactivity, satisfaction with life, and career optimism (Ebner et al., 2018; Gadassi et al., 2012).

Since these relationships were demonstrated based on cross-sectional data, which do not allow statements to be made about the predictive value on careers over time (Kenny, 2019), longitudinal data with reasonable temporal arrangement of the variables is needed, i.e. at least data of two measurement points allowing for cross-lagged analyses or tests for reverse causation are needed (Gollob & Reichardt, 1987). We intend to validate the previously reported cross-sectional relationships with longitudinal data from two measurement points over a period of one year in order to investigate the predictive influence of career decision-making strategies on objective and subjective career success measures (Taris & Kompier, 2014). The basis for this premise is rooted, amongst others, in the temporal stability of how individuals habitually approach their career decisions. Although the choice and application of career decision-making strategies can be influenced by situational factors, research on the Career Decision-Making Profile shows that career decision-making strategies remain reasonably stable over the 1-year period (Gati & Levin, 2012). Analogous to this consideration, the one-year period seems appropriate to carry out an initial exploration of the longer-term relationship between career decision-making strategies and career success.

Summarizing, the investigation of whether the CDA Score as a compound measure of self-directed career management strategies predicts career success indicators over time is new and unanswered. We thus map our endeavors in a first corresponding hypothesis.

Hypothesis 1 The CDA Score (*comprehensive search for information, high internal locus of control, little procrastination, high speed of decision-making, low dependence on other persons, low degree of the desire to please others*) predicts objective and subjective career outcomes over a 1-year period.

The incremental contribution of additional career decision-making strategies to career success

The creators of the CDA Score assume that strategies other than those summarized in the CDA Score are less effective for the decision-making process (Gati & Levin, 2012, p. 392). Ebner et al. (2018) challenged this assumption based on cross-sectional correlations of other CDMP dimensions with career success criteria. For example, it is questionable why only two facets of the social dimension of career decision-making processes were evaluated as adaptive and accordingly included in the CDA Score, while an important third factor concerning the inclusion of social resources (i.e. *consultation with others*) was neglected. Likewise, other dimensions of the career decision-making process are likely to positively influence the decision process and its outcomes such as facets related to the individual's career exploration (e.g., an individual's meticulousness of and effort in collecting and organizing information as depicted with the CDMP dimensions of *information processing* and *effort invested in the process*), especially with regard to the dense body of literature which consolidates the relationship between this specific type of information seeking behavior with advancement, performance and career success (e.g., Jepsen & Dickson, 2003).

It is also unclear why a fundamental flexibility for and adaptability to changing career conditions as represented through the CDMP subscale *willingness to compromise*, was not counted among the particularly adaptive strategies. Empirical evidence for the positive influence of an individual's consideration of alternative career paths and an associated mobility both inside and outside of employing organizations on career success exist (Ng et al., 2005). A similar argument can be made for the *aspiration for an ideal occupation*: In fact, a good fit between the needs, values and ideals of an employee and the values, working conditions, and culture of the organization predicts objective and subjective career success (Bretz & Judge, 1994).

Based on these considerations and findings, we consider it worthwhile and necessary to validate the current composition of the CDA Score methodologically by following a quasi-exploratory approach through which all other strategies not yet included in the CDA Score (i.e. *information processing, effort invested, consultation with others, aspiration for an ideal occupation, willingness to compromise*) are reviewed as being potential predictors of career-relevant outcome variables. Thereby, we will consider career-related outcome variables that go beyond the career decision process itself and, accordingly, consider both, traditional measures of career success and additional measures of career success and career-related psychological well-being.

The incremental contribution of additional career decision-making strategies to objective career success over and above the CDA Score

The differentiation between objective and subjective career success has been established for more than half a century (cf. Heslin, 2005). The two most important criteria for objective career success are promotions and salary. The literature provides evidence for a relationship between objective career success and the career decision-strategies not yet considered within the CDA Score. For example, in a study of 723 full-time employees, the career strategies of having and pursuing personal career aspirations and consulting with third persons about career plans—representing significant parallels to the career decision-making strategies *aspiration for ideal occupation* and *consulting with others*—were found to significantly impact gross annual salary (Nabi, 1999). Likewise, the tendency to thoroughly search for and process information and to invest a great deal of time and effort into the career decision-making process can also be linked to objective career success on the basis of previous findings (Judge et al., 1995). Hence, a connection between the decision-making strategies that are not included in the CDA Score and objective career success is very likely. The corresponding hypothesis is:

Hypothesis 2 Above and beyond the CDA Score, further career decision-making strategies (i.e., *information processing, effort invested, consultation with others, aspiration for an ideal occupation, willingness to compromise*) predict objective career outcomes in terms of promotions (H2a) and income (H2b) over a 1 year-period.

The incremental contribution of additional career decision-making strategies to subjective career success over and above the CDA Score

We consider four measures of subjective career success to clarify the contribution of career decision-making strategies to subjective career success: career satisfaction, career adaptability, labor market knowledge, and occupational optimism.

The contribution of career decision-making strategies on career satisfaction

The most common indicator of subjective career success is career satisfaction; it represents a self-referential evaluation of one's subjective success at work (Judge et al., 1995). The assumption that the way individuals approach and execute their career decisions makes a difference for the evaluation of how satisfied they are with their careers, is in line with previous findings. For example, feeling informed about career options, e.g., knowing the career opportunities within one's employing organization, was previously found to relate to feelings of satisfaction (Stumpf et al., 1983) and has demonstrable parallels to the CDMP dimension *information gathering*. Furthermore, knowing one's skills and having specific goals and expectations for one's future career was shown to relate to perceived career satisfaction (Eby

et al., 2003), which is why we assume that the CDMP dimensions *information gathering* and *aspiration for an ideal occupation* will be related to individuals' career satisfaction. Finally, with regard to the social dimension of career decision-making, i.e. receiving advice and *consulting with others* during the career decision-making process, mentoring research indicates a connection with subjective career success (Ghosh & Reio, 2013). In view of these findings, it seems reasonable to investigate the influence of career decision-making strategies on career satisfaction.

The contribution of career decision-making strategies on career adaptability

Career adaptability is one of the most often discussed measures of a successful career (Krieshok et al., 2009, p. 275). It reflects individuals' skills to manage occupational transitions (e.g. job changes) and to realize career opportunities. Individuals high in career adaptability are characterized by adequate exploration of their vocational environment, a basic ability to adapt, and related vocational coping behavior (Savickas, 1997). Accordingly, labor market knowledge, career adaptability, and occupational optimism are dimensions of Rottinghaus et al.'s *Career Futures Inventory* (2005) which captures these topical and central concepts of recent career theories as indicators of subjects' positive career planning attitudes, all of which correlate with career success in terms of income, promotions or career satisfaction (cf. Spurk & Volmer, 2013).

Previous findings support the assumption that relationships between career decision-making strategies and an individual's ability to adapt to changing career conditions exist. For example, *consulting with others*—the amount of perceived social support during the career decision-making process—was shown to predict career adaptability beyond sociodemographic variables over a 10 months' period (Hirschi, 2009). Likewise, the CDMP dimensions *aspiration for an ideal occupation* and *willingness to compromise* were shown to relate positively to career adaptability cross-sectionally (Ebner et al., 2018).

We additionally investigate if career decision-making strategies also impact one particular facet of career adaptability, namely an individual's knowledge of the job market. An individual's knowledge of the job market, i.e., the understanding for employment trends and the demands that employers have, is crucial to prepare for the labor market entry, to adapt or refine career plans, and to adjust personal efforts in exploring career opportunities (Rottinghaus et al., 2005). We assume that *information processing*, i.e., the degree to which individuals are meticulous and thorough in collecting and organizing information, contributes significantly to the knowledge of the job market. We also expect the career decision-making strategy of *consulting with others* to impact labor market knowledge: It is plausible to assume that conversations with other persons help to acquire profound job-related knowledge and to gauge the relative position of one's own career in comparison to other people's careers.

The last criterion for subjective career success we consider is career optimism— an individual's optimistic attitude towards his or her career and the associated tasks and challenges. Career optimism refers to the expectation to achieve the best possible results within one's career (Youssef & Luthans, 2007). Previous research has

already indicated that a high *speed* of making career decisions is correlated with career optimism (Gati & Levin, 2012). Also, *dependence on others* during career decision-making was shown to relate to a less optimistic attitude towards future careers (Gati & Levin, 2012). A third career decision strategy that was found to correlate with optimism is *aspiration for an ideal occupation*: a positive anticipation for one's career is more prevalent in individuals with high career optimism (Ebner et al., 2018). Yet, all the aforementioned relationships have been identified by cross-sectional data and, hence, the direction of these relationships cannot be identified, so that it remains unclear whether, for example, career optimism does lead to more striving for the ideal job instead of the other way round. Our intention to clarify the predictive influence of career decision-making strategies on subjective career success is summarized in a third hypothesis:

Hypothesis 3 Above and beyond the CDA Score, further career decision-making strategies (i.e., *information processing, effort invested, consultation with others, aspiration for an ideal occupation, willingness to compromise*) predict subjective career outcomes in terms of career satisfaction (H3a), career adaptability (H3b), labor market knowledge (H3c) and occupational optimism (H3d) over a 1-year period.

The incremental contribution of additional career decision-making strategies to psychological well-being over and above the CDA Score

In addition to the traditional objective and subjective criteria of career success, there are other criteria that individuals apply to evaluate their career success. According to Heslin (2005), individuals strive for forms of career success which are much less tangible than—for example—income and promotions. Work-life balance, time for oneself, or well-being are common examples (Arthur et al., 2005). We will consider these forms of success as psychological well-being measures. Specifically, we consider life satisfaction and irritation.

Life-satisfaction is a traditional measure of subjective well-being (Diener et al., 1999). An individual's judgement of how well one feels is an essential facet of success in one's working life. Procrastinating, too much effort invested during the decision-making process, and feeling dependent on others have been demonstrated to be cross-sectionally related to a more critical assessment of one's life satisfaction (Ebner et al., 2018). Yet, an investigation of whether these habitual decisional strategies also have a negative longitudinal effect on life-satisfaction would cast an informative light on career decisions.

Psychological well-being at work also comprises the absence of stress (Van der Doef & Maes, 1999). The level of stress at work is therefore considered as an appropriate measure for investigating the influence of career decision-making behaviors on psychological well-being. One common measure of stress at work is irritability. It depicts emotional and cognitive strain that the individual perceives and thus represents a measure of mental impairment in the occupational context (Mohr et al.,

2006, p. 198). In particular, career transitions are linked with irritation (Rigotti et al., 2014).

Prior findings demonstrate that several career-decision making behaviors are related cross-sectionally to irritation: high *effort* during decision-making and a high quantity of information that is processed amongst others appear to be drivers of stress (Ebner et al., 2018). Only when decisions are made fairly quickly (high *speed of making the decision*), or when decisions are based on what the person thinks is ideal (high *aspiration for an ideal occupation*), the relationship is negative. Based on these relationships, it becomes apparent that irritation seems to be a very sensitive measure of what people experience who are concerned with their career future.

Hypothesis 4 Above and beyond the Career Decision-Making Adaptability Score, further career decision-making strategies (i.e., *information processing, effort invested, consultation with others, aspiration for an ideal occupation, willingness to compromise*) additionally predict psychological well-being in terms of life-satisfaction (H4a), and irritation (H4b) over a 1 year-period.

Method

Procedure and participants

At Time 1, a variety of business, private, and career networks were approached to recruit study participants in Germany (e.g., LinkedIn and e-mail lists) and adverted to the study. 620 respondents finished an online questionnaire at Time 1, and 203 (32.74%) agreed to be invited to follow-up studies. For Time 2 data gathering, these 203 individuals were invited one year later via personal e-mails, to voluntarily participate in the follow-up study. The resulting sample comprised 142 participants (69.95% response rate) at both measurement points consisting of both, employees and students, reflecting a retention rate comparable to other longitudinal studies in the field (e.g., Waters et al., 2014). Only full-time employed participants were included in the present study, which led to a final sample comprising 78 participants. A power analysis showed that—assuming a medium effect size ($f^2=0.15$)—the sample size required to reach a power of 0.80 for testing a single regression coefficient (one-tailed $\alpha=0.05$) in a multiple regression with ten predictors was $N=44$. Thus, our sample size was large enough for the conventional level of power of 80% (Faul et al., 2009). A post hoc analysis showed that the actual power for our sample size of 78 people was 0.96 for medium effect sizes.

Persons who dropped out between the measurement points reported lower occupational optimism ($p=0.02$). No other significant signs for selective attrition were found. No incentive was paid to study participants. The participants were employed in different settings and industry branches (i.e., employed, self-employed, or in vocational training) and 65.4% were female. The mean age of the sample was 34.2 years ($SD=8.69$, ranging from 19 to 56 years). Regarding education, 2.6% had a 10 years-school education, 9.0% had a high school diploma, equivalent to 12 or 13 years

of education, 9.0% had finished a bachelor's degree, and 64.1% a master's degree. Finally, 11.5% had completed a PhD.

The average length of work experience was 10.0 years ($SD=9.08$) at Time 1. A combined measure of several possible educational and occupational changes (e.g., change of field of study or change of employer) revealed that on average, respondents had experienced 2.3 ($SD=2.66$) changes in the past, with a minimum of zero and a maximum of 10 changes. 69.2% of the participants reported to be currently engaged in a career-related decision.

Measures

Career decision-making

Career decision-making was assessed using the German version of the Career Decision-Making Profile (G-CDMP, Ebner et al., 2018). Its 36 items are rated on a 7-point Likert scale ranging from 1 (*does not apply*) to 7 (*does fully apply*). Example items are: "When I need to make a decision, I invest a lot of time and effort in it" (*effort invested in the process*-subscale), or "I usually consider my choices and make my decisions without consulting others" (*consultation with others*-subscale). The instrument's factorial validity was confirmed in various language versions (Gati et al., 2010; Ginevra et al., 2012; Tian et al., 2014). The factorial validity of the German version was confirmed based on data from the first measurement time point of the present study (cf. Ebner et al., 2018). Yet, at the time of the data collection at Time 1, intuitive decision-making could not be considered, since we relied on the original English version comprising of 11 dimensions (Gati et al., 2010). With regard to the *willingness to compromise*-subscale, we found that the original formulations of two of its three items do not fit to non-student samples (e.g., "If I am not accepted for my first-choice major or training program, I want to compromise and opt for my second choice"). The subscale was therefore omitted. Cronbach's Alpha for the subscales ranged from 0.70 to 0.93 at Time 1, and 0.72 to 0.93 at Time 2.

Objective career success

Promotions. At Time 2, participants were asked to indicate how many times they had already been promoted in their careers and how many promotions they had received during the previous year, i.e. since the data collection in year 1 of the two-wave study. The difference in the number of promotions that were reported (overall career minus last year) served as baseline measure.

Income growth. Income was reported by participants for both measurement points. At Time 2, they were asked to indicate their income in the previous year, and then also asked to estimate their expected gross income for the current year (cf. Wolff & Moser, 2009). Since income was a highly skewed variable ($Skewness/SE_{Skew}=8.46$ at T1 and 10.55 at T2), the scores were transformed to their square root to normalize the distribution.

Subjective career success

Career satisfaction Career satisfaction was assessed using two items. One item assessed participants' satisfaction with their overall career (using a German version of the Perceived Career Success Scale; Turban & Dougherty, 1994): "I am satisfied with my career development.". The second item asked participants to rate their satisfaction with their career decisions ("I am satisfied with my previous career decisions."; item leaning on Greenhaus et al.'s career satisfaction scale, 1990; translation by the authors). Both items were answered on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Cronbach's α reached a value of 0.88 at Time 1 and 1.00 one year later.

Career adaptability, optimism, and knowledge of the job market Participants' career adaptability, career optimism, and knowledge of the job market were assessed using the respective subscales from the German version of Rottinghaus et al.'s Career Futures Inventory (CFI; Spurk & Volmer, 2013). Each subscale consists of three items which have to be responded to on a 6-point Likert-type scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). An example item is "Thinking about my career inspires me" (item from the career optimism-subscale; cf. Rottinghaus, et al., 2005). Cronbach's Alpha was 0.75 (T1) and 0.71 (T2) for career adaptability, 0.83 (T1) and 0.85 (T2) for career optimism, and 0.78 (T1) and 0.78 (T2) for knowledge of the job market, respectively.

Psychological well-being

Life-satisfaction As a measure of well-being, the satisfaction with life at the present-subscale of the German version of Pavot et al. (1998) Temporal Satisfaction with Life Scale was applied (Trautwein, 2004). Four items such as "My current life is ideal for me" are to be responded on a 4-point Likert-type scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Cronbach's Alpha was $\alpha=0.87$ (T1) and $\alpha=0.85$ (T2).

Irritation. Irritation was assessed using a widely used German irritation scale (Mohr et al., 2005). We used the subscale of emotional irritation to measure the affective reactions to occupational demands with 5 items (item example: "I occasionally react grumpy when others speak to me", item translated by the authors), and the subscale of cognitive irritation in order to capture individual's inability to cognitively detach from work (3 items; item example: "I am thinking of difficulties at work even when I am at home", item translated by the authors) on a 6-point scale from 1 (*does not apply at all*) to 6 (*does fully apply*). Cronbach's Alpha was good with 0.87 (T1) and 0.86 (T2) for emotional irritation and 0.87 (T1) and 0.87 (T2) for cognitive irritation.

Statistical analyses

The predictive value of career-decision styles on objective and subjective career success and psychological well-being was assessed through a series of Ordinary Least Square regression analyses using IBM SPSS Statistics version 26. Specifically, we used the lagged regression approach to predict the outcome variable (e.g., career satisfaction) at Time 2, with the baseline measure of the dependent variable as additional predictor, together with the predictors of interest (the career decision-making strategies) at Time 1. Each regression was conducted in three steps. In step one, the value of the dependent variable at Time 1 was included (along with control variables) in order to control for the stability of the dependent variable. What remains is the unstable component of the outcome variable, i.e., the change over time, thus the lagged regressions predict the change in the outcome between T1 and T2 (Newsome, 2012). In the next step, the CDA Score was added to the predictors. Finally, we added those career decision strategies to the list of predictors that are not represented in the CDA Score. To rule out a possible reverse causation, we conducted further lagged regressions in all those cases where a significant effect had been identified in our principal analysis. In these analyses, the dependent variable was the value of the respective career-decision strategy at T2 which was predicted by the T1-measure of the variable that had originally been used as outcome variable (e.g. life satisfaction), with demographic variables and the T1 value of the career-decision strategy as control variables (Zapf et al., 1996).

For the analysis predicting income, seven participants reporting their income to be zero and one outlier with very high income (> 3 SD above the mean) were excluded; for the analysis predicting promotions, one outlier reporting 19 promotions at the age of 45 (> 6 SD above the mean) was excluded.

We controlled all analyses for age, gender, education (high vs. low), and number of occupational changes the individuals had experienced until Time 1 of the data collection. All control variables have been shown to affect both objective and subjective career success as well as overall well-being (e.g. Amdurer et al., 2014; Ng et al., 2005).

Results

The means for the career decision strategies at T1 and at T2 were very similar (see Table 1). Dependent t-tests did not show any significant changes between measurement points. This impression of high stability was further endorsed by high test–retest correlations, with a range from $r = 0.47^*$ to $r = 0.68^{**}$.

Bivariate cross-sectional correlations demonstrated that the CDA Score was significantly associated with the majority of outcome measures at T1 or T2 (e.g., income or labor market knowledge; see Table 1). However, for the career decision strategies not included in the CDA Score, i. e. *aspiration for an ideal occupation*, *consultation with others*, *effort invested in the process*, and *information processing*, we also found several significant bivariate correlations at T1 and T2.

Table 1 Intercorrelations of Construct Measures at T1 and T2

First measurement point	M/SD T1	M/SD T2	Second measurement point													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 CDA	4.7/0.62	4.6/0.60	.68**	.08	-.31**	.02	.06	-.12	.36**	.17	.16	.38**	.24*	.23*	-.14	-.24*
2 Information-processing	5.3/1.15	5.5/1.06	.05	.48**	.66**	.16	.08	-.08	-.10	.14	-.14	.30*	.07	-.04	.18	-.09
3 Effort invested in the process	4.5/1.28	4.5/1.28	-.24*	.62**	.62**	.20 ⁺	.08	.04	-.25*	-.03	-.27*	.10	-.02	-.31**	.33**	.16
4 Consultation with others	5.0/1.56	4.8/1.69	-.10	.12	.07	.64**	.04	-.03	-.31*	-.05	-.40**	-.03	-.17	.02	.29*	.17
5 Aspiration for an ideal occupation	5.1/1.32	5.2/1.36	.12	.14	.30**	.12	.47**	.03	-.12	.28*	.28*	.44**	.29*	.08	-.03	-.06
6 Promotions	1.5/2.69	0.3/0.51	.06	.00	-.16	-.26*	-.25*	.09	.04	.17	.11	.10	.09	.13	-.06	.06
7 Income (Sqrt.)	209.6/78.2	217.8/81.9	.25*	.02	-.21 ⁺	-.28*	-.21 ⁺	.63**	.96**	.09	.22 ⁺	.23 ⁺	.36**	.18	-.07	-.22 ⁺
8 Career Satisfaction	4.2/0.87	4.0/0.80	.18	-.01	-.10	.16	-.08	-.00	.08	.74**	.30*	.54**	.16	.29*	.06	-.18
9 Adaptability	4.8/0.82	4.8/0.76	.17	-.13	-.17	-.28*	-.03	.20 ⁺	.21 ⁺	.05	.61**	.28*	.35**	.08	-.29*	-.33**
10 Occupational Optimism	5.0/0.82	4.9/0.94	.15	.06	.09	-.02	.39**	-.01	.08	.45**	.23*	.58**	.37**	.34**	.01	-.15
11 Labor market knowledge	3.4/1.07	3.6/1.12	.27*	.03	.02	-.10	-.03	.27*	.47**	.03	.30**	.16	.72**	.10	-.28*	-.18
12 Life Satisfaction	3.0/0.67	3.1/0.65	.05	-.12	-.14	.11	-.01	-.00	.03	.44**	.12	.22 ⁺	.14	.54**	-.19	-.40**
13 Cognitive irritation	3.3/1.26	3.4/1.23	-.26*	-.03	.14	.22 ⁺	-.02	.01	-.09	.03	-.26*	.03	-.25*	-.12	.70**	.55**
14 Emotional Irritation	2.4/0.91	2.5/0.92	-.15	.15	.08	.09	-.09	.02	-.06	-.33**	-.40**	-.19 ⁺	-.25*	-.50**	.45**	.64**

Pearson's correlations between variables at both measurement times; below diagonal: time 1, above diagonal: time 2; correlations in the diagonal are test-retest reliabilities (bold); ⁺ $p \leq .10$, * $p \leq .05$, ** $p \leq .01$; M/SD-T1/T2; Means and standard deviations for the first and second measurement time; Sample size: $n = 71-78$, for income: $n = 64-66$ due to restriction to participants with income > 0 € at both measurement points

Table 2 Effects of the CDA Score and incremental career decision-making strategies on objective career success

	Promotions			Income (Sqrt)		
	<i>Beta</i>			<i>Beta</i>		
<i>Step1</i>						
Age	-.45**	-.45**	-.43*	.00	.03	.03
Gender	.16	.16	.09	.05	.06	.05
Education	-.05	-.04	-.04	.06	.09*	.09 ⁺
Occ. change	.14	.13	.09	.00	-.04	-.04
DV T1	.11	.11	.13	.94**	.89**	.89**
<i>Step2</i>						
CDA		.04	-.03		.13**	.12*
<i>Step3</i>						
Info processing			.04			.02
Effort invested			-.08			-.04
Consult. with others			-.22 ⁺			.01
Aspiration ideal occ			.22			.02
<i>Explained variance</i>						
<i>R</i> ²	.12	.12	.19	.91	.92	.92
<i>Adjusted R</i> ²	.05	.04	.06	.90	.91	.91
ΔR^2	.12	.00	.07	.91**	.01**	.00

Gender: female=1, male=2; Education: low=0, high=1; Occ. Change: number of changes of employer, education or career; DV T1= respective dependent variable at T1; ⁺ $p \leq .10$, * $p \leq .05$, ** $p \leq .01$; $n = 62-69$, OLS-regression. *Info processing* information processing, *Consult. with others* consulting with others with higher values indicating refusal to consult with others, *Aspiration ideal occ.* aspiration for an ideal occupation

Next, we used stepwise OLS-regression in order to estimate the contribution of career decision-making strategies in predicting career-related outcomes. In all analyses except for promotions, the value of the outcome variable at the first measurement point had a strong and significant impact on the value of the outcome variable at the second measurement point, demonstrating a considerable stability of the outcomes scrutinized here (cf. Tables 2, 3, and 4). The control variables predicted the value of the outcome variables at the second measurement time only in a few instances: Older people reported a marginally significant reduction in their career satisfaction between T1 and T2. Formerly experienced occupational change was positively related to gains in adaptability and (as a weak trend) to an increase in career satisfaction. Furthermore, a high education was positively predictive of increases in life satisfaction and income, though this was only the case in the later steps of the regression, when the CDA Score was included as an additional predictor.

As expected and consistent with extant research, the CDA Score had a significant influence on several of our outcome variables: A high CDA Score led to a significant increase in income ($\beta = 0.12$; $p \leq 0.05$; cf. Table 2), occupational

Table 3 Effects of the CDA Score and Incremental Career Decision-Making Strategies on Subjective Career Success

	Career satisfaction		Adaptability		Occupational optimism		Labor market knowledge			
	Beta		Beta		Beta		Beta			
<i>Step1</i>										
Age	-.19 ⁺	-.18	-.08	-.09	-.07	-.05	-.04	-.02	.04	.03
Gender	.08	.04	-.06	-.06	-.12	-.07	-.04	-.04	.03	.00
Education	-.10	-.11	.03	.03	.04	.01	.06	.04	-.09	-.06
Occ. Change	.18 ⁺	.18	.30 [*]	.31 [*]	.32 [*]	.08	.00	-.02	-.10	-.09
DV T1	.74 ^{**}	.80 ^{**}	.58 ^{**}	.59 ^{**}	.50 ^{**}	.60 ^{**}	.55 ^{**}	.53 ^{**}	.74 ^{**}	.70 ^{**}
<i>Step2</i>										
CDA	-.03	-.07	-.05	-.05	-.11		.27 ^{**}	.30 [*]	.07	.11
<i>Step3</i>										
Info processing		.04			-.00			-.01		-.24 [*]
Effort invested		.02			-.13			.10		.17
Consult. with others		-.20 [*]			-.22 [*]			.04		-.05
Aspiration ideal occ		.09			.10			.06		-.03
<i>Explained variance</i>										
R ²	.57	.57	.45	.46	.51	.38	.45	.46	.52	.56
Adjusted R ²	.53	.53	.41	.41	.43	.33	.39	.37	.48	.48
ΔR ²	.57 ^{**}	.00	.45 ^{**}	.00	.05	.38 ^{**}	.06 ^{**}	.02	.52 ^{**}	.04

Gender: female = 1, male = 2; Education: low = 0, high = 1; Occ. Change: number of changes of employer, education or career; DV T1 = respective dependent variable at T1; ⁺ $p \leq .10$, ^{*} $p \leq .05$, ^{**} $p \leq .01$; $n = 69-71$, OLS-regression. *Info processing* information processing, *Consult. with others* consulting with others with higher values indicating refusal to consult with others, *Aspiration ideal occ.* aspiration for an ideal occupation

Table 4 Effects of the CDA Score and incremental career decision-making strategies on psychological well-being

	Life satisfaction			Cognitive irritation			Emotional irritation		
	<i>Beta</i>			<i>Beta</i>			<i>Beta</i>		
<i>Step1</i>									
Age	.05	.06	.05	-.11	-.12	-.10	-.09	-.10	-.11
Gender	.00	.01	.02	-.02	-.03	.01	-.10	-.11	-.13
Education	.17	.22*	.23*	-.04	-.05	-.06	-.04	-.07	-.10
Occ. change	-.06	-.16	-.14	.10	.12	.09	.06	.13	.15
DV T1	.52**	.50**	.49**	.71**	.69**	.70**	.62**	.59**	.61**
CDA		.36**	.38**		-.08	-.09		-.21*	-.23*
<i>Step3</i>									
Info processing			-.07			.19			-.10
Effort invested			.03			-.02			-.10
Consult. with others			.04			.04			.14
Aspiration ideal occ			-.06			.00			.00
<i>Explained variance</i>									
R^2	.31	.43	.44	.49	.50	.53	.42	.46	.50
<i>Adjusted R</i> ²	.27	.38	.35	.45	.45	.45	.37	.41	.42
ΔR^2	.31**	.12**	.01	.49**	.01	.03	.42**	.04*	.04

Gender: female=1, male=2; Education: low=0, high=1; Occ. Change: number of changes of employer, education or career; DV T1 = respective dependent variable at T1; ⁺ $p \leq .10$, * $p \leq .05$, ** $p \leq .01$; $n = 71-75$, OLS-regression. *Info processing* information processing, *Consult. with others* consulting with others with higher values indicating refusal to consult with others, *Aspiration ideal occ.* aspiration for an ideal occupation

optimism ($\beta = 0.30$; $p \leq 0.01$; cf. Table 3) and life satisfaction ($\beta = 0.38$; $p \leq 0.01$), as well as to a significant reduction in emotional irritation between T1 and T2 ($\beta = -0.23$; $p \leq 0.05$; cf. Table 4). Thus, hypothesis 1, which proposed that the six career decision-making strategies combined within the CDA Score would predict objective and subjective career outcomes over a 1-year period, was endorsed for several different outcome variables. Checking for reverse causation, we found no effects of income, occupational optimism, life satisfaction, and emotional irritation on changes of the CDA Score. Thus, the influence of the CDA Score appears to be unidirectional.

In the final step of our regressions, those career decision-making strategies were added to the set of predictors that are traditionally not included in the CDA Score, i.e., *information processing*, *effort invested*, *consulting with others*, and *aspiration for an ideal occupation*. Since the CDA Score was also included as a predictor in this regression, the effects for these strategies indicate independence from a general influence of career decision-making strategies as represented by the CDA Score.

The results show that, first, frequent *consultation with others* proved to be a strategy that had a positive effect on the outcome criteria: A high score in this

strategy at T1 was associated with a significant increase in career adaptability ($\beta = -0.22$; $p \leq 0.05$) and in career satisfaction ($\beta = -0.20$; $p \leq 0.05$) between T1 and T2, and it also tended to predict promotions ($\beta = -0.22$; $p \leq 0.10$). (cf. Tables 2 and 3; note that the scale is reversely coded and high positive values express a high refusal to consult with others). Thus, for *consultation with others*, we found some evidence supporting hypotheses 2a, 3a and 3b indicating that a more frequent consultation with others during the decision-making process predicts beneficial career outcomes. For *information processing*, an unexpected significant negative effect on changes in labor market knowledge emerged ($\beta = -0.24$; $p \leq 0.05$), indicating that people who are willing to thoroughly search for and process information appear to evaluate their self-assessed labor market knowledge more critical at the second measurement point compared to T1, contradicting hypothesis 3c.

For all of the aforementioned effects, we also tested for possible influences in the opposite direction to the hypothesized one (i.e. from the outcome variable to the career decision-making strategy). None of these tests yielded significant results.¹

Discussion

The purpose of this study was, first, to validate the CDA Score in a research design with two measurement points. Second, we wanted to explore the predictive value of career decision-making strategies which are not included within the CDA Score on objective, subjective and further career success measures in order to derive recommendations for a possible expansion of the CDA Score.

We found support for the assumption that the CDA Score contributes to predicting objective and subjective measures of career success and psychological well-being over a 1-year period. The present study thus confirmed the proposed effectiveness of six decision-strategies that were accentuated previously as adaptive and combined into the CDA Score. Specifically, we found that the CDA Score contributed to higher income, a more optimistic attitude toward one's career, higher life satisfaction and less emotional irritation. Thus, *comprehensive* information gathering, *internal* locus of control, *little* procrastination, *high* speed of making the final decision, *low* dependence on others, and *less* desire to please others, have beneficial effects on career outcomes over a 1-year period.

Furthermore, we found that two decision strategies which are not included in the CDA Score so far also affect subjective, objective and psychological career success. Specifically, consulting with others during the career-decision making process additionally contributes to individuals' satisfaction with their careers and career adaptability, characterizing *consultation with others* as a further adaptive strategy and

¹ A reviewer suggested that education might itself be an outcome of career decision-making strategies. Therefore, we repeated the analyses without education as control variable. The results were very similar to the results with education included: All significant findings remained stable, with the exception of the effects of the CDA Score on income and on emotional irritation, which were slightly weakened to marginally significant trends (income: $\beta = .08$, $p = .090$; emotional irritation: $\beta = -.21$, $p = .053$).

indicating that CDMP dimensions that were not included in the CDA Score to date indeed contribute to career success over and above the CDA Score. Based on these findings, we would advocate to consider the extent to which individuals engage in consulting with others as advantageous, and hence expanding the CDA Score with this dimension.

Unexpectedly, we also found that individuals who are strongly engaged in analytically processing information about various occupational options and alternatives goes hand in hand with a more critical evaluation of one's labor market knowledge. The assumption that an intensive occupation with opportunities in the labor market and its trends and developments leads to a better grasp of its complexity and a more moderate assessment of one's understanding of this market seems plausible.

With these findings, we extend previous research in several ways: First, we investigated the predictive impact of career decision-making behavior on outcome measures that are not related to the career decision-process itself as considered previously, but to individuals' well-being and pertinent career success indicators. We also extended previous investigations relying on samples of students (e.g., Gati & Levin, 2012; Tian et al., 2014), by surveying employees with longstanding work experience. Finally, we provided empirical endorsement of the validity of the CDA Score as predictor of relevant career-related outcome measures, which was previously rarely empirically tested.

Limitations and future research

It is possible that the prevailing cultural values and standards determine the use of specific decision-making strategies, meaning that they promote certain behaviors and limit others (Weber & Hsee, 2000). Therefore, the study's generalizability and its scope are limited to countries with a culture similar to Germany's and it is advisable to replicate the findings reported here in different cultural contexts. Due to the possibility of capturing career decision-making strategies by using the English, Italian, Chinese and Hebrew versions of the CDMP (Gati et al., 2010; Tian et al., 2014), a basis for further cross-cultural comparative studies exists. Future research should then rely on the revised version of the CDMP containing twelve dimensions, i.e., consider intuition and willingness to comprise, and an attempt should be made to target a more heterogeneous sample, as the results presented here are generalizable mainly to white collar-workers due to the sample's high educational level.

As a further limitation, self-report measures were used to assess career success with its known shortcomings of, for example, answer tendencies or social desirability bias (Podsakoff et al., 2003). We encourage the inclusion of objective career success measures such as supervisors' performance appraisals in future studies. Another point of criticism is related to construct measurement: Specifically, two of the three items of the willingness to compromise-subscale do not fit to non-student samples, which precluded the use of this subscale in the present sample of employed individuals. Specifically, we had a sample consisting entirely of employed persons working in several different industrial branches, with a large age range from 19 to 56, and a diverse list of educational attainments. We therefore propose to adapt the subscale's

items' wording (cf. Wee, 2013) and hence enable its application with individuals who have already completed their education and training in future research.

Furthermore, it is worth mentioning that the study participants who have provided data over a one-year period differed from the sample at the first measurement point with regard to occupational optimism. The participants that joined our T2-data collection might have less clarity on their career future. This is reflected in our data, which reveal that our participants were strongly interested in career-related topics. However, individuals strongly occupied with their career design will use their career decision-making strategies more often or strongly and this should strengthen the effects on the outcome variables under study and thus make our sample very appropriate for our research endeavor.

It might also be recommendable to add further control variables to the analyses in order to eliminate possible confounding influences. Helpful alternative approaches to solve the problem of omitted (unmeasured) variables could be, for example, fixed-effects analyses with multiple time-point longitudinal designs or experimental designs, where career decision strategies of participants are intentionally manipulated. Both designs would provide better control for endogeneity (Duncan et al., 2004).

Finally, the causal direction of the relationships found is not completely clarified by relying on two measurement times. That is, although the results provided evidence for the proposed direction of influence and the findings of our two-wave study seem to be adequate in light of the theoretical and empirical foundations, there is the need to test a reversed causation in future studies with multiple waves of data, since a two-wave design cannot completely rule out the reverse causation hypothesis (e.g., Singer & Willett, 2003). These should then also be based on a larger sample since the moderately large sample size in the present study prevented the identification of small effects (cf. Cohen, 1988; G*Power, 1992–2020). In addition, it is reasonable to extend the data collection period, since the one-year period examined here is too short to sufficiently determine changes in objective career success measures such as income.

Theoretical implications

By investigating the impact of all career decision-making strategies outlined in the CDMP, we were able to provide a further empirical foundation for the assumption that six strategies are particularly adaptive. More importantly, the findings indicate that additional strategies which have not found their way into the CDA Score, are important in predicting career outcomes. Specifically, the tendency to consult with others during the decision-making process appears to be adaptive.

Further, our findings expand knowledge on how career planning activities contribute to career success. Previously, meta-analytic findings demonstrated that an individual's career planning behavior predicts career success in terms of salary and career satisfaction (cf. Ng et al., 2005). Our findings specify this relationship, taking into account that career planning is more than just having any kind of strategy.

Rather, there are a variety of approaches towards career decisions with specific and unique impact on career success.

Practical implications

The process of decision-making happens to a large extent subconsciously and many people are not clear on how they make decisions (Driver, 1979). For counseling interventions, it may be helpful to identify and discourage career decision-making strategies that are less conducive and to encourage the use of strategies that are positive for career development. Thereby, two findings of the present study are of particular practical importance:

First, career decision-making behavior which is characterized by what the CDA Score measures was shown to relate to more income, a more optimistic attitude, higher life satisfaction, and less emotional irritation. This indicates what counseling clients should be encouraged to do: clients should be supported in developing a sense of autonomous control over their careers and be encouraged to find and follow their own career-related preferences (instead of clinging to advice from others). After a thorough search for relevant information, they should also be encouraged to not unnecessarily delay their final decision.

Our results can be translated into a second recommendation for the practice of career counseling. A high extent to which clients include (significant) others, search for their advice, and openly exchange ideas was found to lead to higher career satisfaction and career adaptability and might even contribute to promotions. Career counselors should thus explore how pronounced this strategy is, and if necessary, work with their clients on the idea to consider more strongly the use of this strategy by addressing clients' social relationships, exploring of how much they could contribute to the career-decision process, and generating ideas for changing clients' attitudes towards consultation with others. Summarizing, we encourage to provide career counseling services according to the empirically derived recommendations on working on specific career decision-making strategies in order to pave the way into satisfactory careers.

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