International Journal for Educational and Vocational Guidance (2026) 26:59–78
https://doi.org/10.1007/s10775-024-09691-6

Conceptions of career choice and attainment in Portuguese preschool and elementary-school children

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Received: 22 March 2023 / Accepted: 17 November 2023 / Published online: 24 July 2024

Abstract

The Conceptions of Career Choice and Attainment (CCCA) model has been supporting research on children's career reasoning, particularly in the USA. This study examines the applicability of the CCCA model to Portuguese preschool and elementary-school children. The CCCA interview was answered by 101 children (38.6% preschoolers, 61.4% elementary schoolers; $M_{age} = 6.68$). Results indicated that elementary schoolers present significantly higher levels of career choice and attainment reasoning than preschoolers. Future studies with middle schoolers are needed to keep investigating the model in Portugal. Studies in other countries would also be useful to encourage collaboration in childhood career development research and practice.

Keywords Childhood career development · Career choice · Career attainment

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Résumé
Le modèle de Conceptions du Choix de Carrière et de la Réalisation (CCCA) a été utilisé pour soutenir la recherche sur le raisonnement de carrière des enfants, particulièrement aux États-Unis. Cette étude examine l'applicabilité du modèle CCCA aux enfants portugais de maternelle et d'école primaire. L'entretien CCCA a été répondu par 101 enfants (38,6% de maternelle, 61,4% d'école primaire; $M_{\text{âge}} = 6{,}68$). Les résultats indiquent que les élèves de l'école primaire présentent des niveaux significativement plus élevés de raisonnement sur le choix de carrière et la réalisation que les enfants de maternelle. Des études futures avec des collégiens sont nécessaires pour continuer à enquêter sur le modèle au Portugal. Des études dans d'autres pays seraient également utiles pour encourager la collaboration dans la recherche et la pratique du développement de carrière en enfance.

Zusammenfassung
Das Modell der Vorstellungen von Berufswahl und Erreichung (CCCA) hat die Forschung zur beruflichen Orientierung von Kindern, insbesondere in den USA, unterstützt. Diese Studie untersucht die Anwendbarkeit des CCCA-Modells auf portugiesische Vorschul- und Grundschulkinder. Das CCCA-Interview wurde von 101 Kindern beantwortet (38,6% Vorschulkinder, 61,4% Grundschulkinder; $M_{\text{Alter}} = 6{,}68$). Die Ergebnisse zeigten, dass Grundschulkinder signifikant höhere Ebenen der Berufswahl und Erreichungslogik aufweisen als Vorschulkinder. Zukünftige Studien mit Mittelschülern sind notwendig, um das Modell in Portugal weiter zu untersuchen. Studien in anderen Ländern wären ebenfalls nützlich, um die Zusammenarbeit in der Forschung und Praxis zur beruflichen Entwicklung im Kindesalter zu fördern.

Resumen
El modelo de Concepciones de Elección y Logro de Carrera (CCCA) ha estado apoyando la investigación sobre el razonamiento de carrera de los niños, particularmente en los EE.UU. Este estudio examina la aplicabilidad del modelo CCCA a niños portugueses de preescolar y primaria. La entrevista CCCA fue respondida por 101 niños (38.6% preescolares, 61.4% de primaria; $M_{\text{edad}} = 6.68$). Los resultados indicaron que los estudiantes de primaria presentan niveles significativamente más altos de razonamiento de elección y logro de carrera que los preescolares. Se necesitan estudios futuros con estudiantes de secundaria para seguir investigando el modelo en Portugal. Los estudios en otros países también serían útiles para fomentar la colaboración en la investigación y práctica del desarrollo de carrera en la infancia.

Childhood is a foundational period for human development, during which one's sense of trust, autonomy, and initiative are developed (Erikson, 1963). Experiences lived in childhood support the emergence of career conceptions and intentions for the future, with impact on one's potential to adapt and well-being (Covacevich et al., 2021; Hartung, 2015; Magnuson & Starr, 2000; Peila-Schuster, 2018). Like other human development domains (e.g., cognitive, social–emotional), career

development progresses throughout the lifecycle and across several contexts in an integrative manner (Peila-Schuster, 2018; Vondracek et al., 2014). However, unlike literature regarding other human development domains, the career development literature has been mostly focused on adolescence and adulthood (Araújo & Taveira, 2009). Thus, childhood career development still needs to be more systematically covered (Briddick et al., 2018; Hartung et al., 2005).

Theoretical and empirical progress has been made in the past decades (Watson & McMahon, 2022). From a theoretical point of view, the landmark contributions of developmental career theories need to be highlighted. Gottfredson's (1981) circumscription and compromise theory suggested that cognitive development and the social environment enable a progressive circumscription of occupational preferences throughout childhood. The circumscription process influences career choices and attainment later in adolescence and adulthood. Additionally, Super's (1980) lifespan and life-space theory conceived of childhood as a period of growth in career development with specific tasks and features. Besides sustaining international empirical and practical efforts on childhood career development (Oliveira et al., 2017), these theories have also prompted other theories to acknowledge childhood. For example, Lent et al.'s (1999) social cognitive career theory acknowledges that social cognitive mechanisms, such as self-efficacy or outcome expectations, are developed through children's interactive experiences with their contexts and key figures, which in turn impact the development of future interests and goals. Vondracek et al.'s (2014) living systems theory of vocational behavior and development also identifies childhood as a period in which specific behavior episodes occur, which can be accumulated in a person's episode schema that follows his/her vocational behavior throughout the lifespan. In addition, Savickas' (2002, 2021) career construction theory suggests that early experiences constitute the foundation from which an autobiographical narrative and career stories are built. Children's experiences also nourish the development of career intentions and career meta-competencies, namely career adaptability and identity.

On the other hand, research has afforded the possibility to deepen knowledge of children's career development constructs and learning about the working world, to identify personal and contextual influences, and to investigate the efficacy of early career practices (Hartung et al., 2005; Oliveira et al., 2017; Watson & McMahon, 2005, 2022; Watson et al., 2015). Progress in the development of quantitative and qualitative tools to assess children's career development has also been noticed (Stead et al., 2017). Both methodologies are important to address what and how children learn about careers, in addition to understand career development in heterogeneous contexts (Watson & McMahon, 2005; Watson et al., 2015).

Still, two areas to improve the assessment of children's career development can be considered. First, the use of quantitative tools has prevailed due to their practical advantages enabling group assessments and being less time-consuming for researchers and practitioners. However, quantitative tools require children's reading abilities, have mostly been used in middle school, and do not afford the possibility of fully appreciating children's career perspectives. Hence, calls have been made to consider qualitative tools to better capture individuals' perspectives and to facilitate research and practice with young children (Watson

et al., 2015). Second, extant tools have mostly served the assessment of children's aspirations, occupational information, and career awareness. Tools targeting other career development processes are needed, as they would be useful to assist a more comprehensive assessment required for both career research and practice with children. In this regard, the Conceptions of Career Choice and Attainment protocol (Howard & Walsh, 2010) holds potential to improve career assessment, as it acknowledges children's career thinking.

This protocol consists of a semi-structured interview and relies on the Children's Conceptions of Career Choice and Attainment model (CCCA; Howard & Walsh, 2010, 2011). The CCCA model describes how children think about the working world. It relies on the integration of theoretical and empirical contributions from developmental psychology, childhood career development, career-decision making, and cognitive reasoning related to other processes (e.g., illness, violence) (Howard & Walsh, 2010, 2011). Three main reasoning approaches are proposed by the CCCA model to describe how one thinks about career choice and attainment: Association, Sequence, and Interaction. Based on developmental contextualism (Lerner, 2002), the CCCA model assumes that these reasoning approaches follow a developmental sequence, nurtured through ongoing person-in-context interactions. Thus, cognitive reasoning about career choice and attainment develops in an orderly and increasingly complex fashion. Such reasoning moves from Association to Sequence (expected in childhood), and from Sequence to Interaction approaches (expected in adolescence and young adulthood) (Howard et al., 2017). Assuming the developmental progress from one approach to the next, each career reasoning approach can be divided into two levels.

The first approach, Association, is characterized by magical thinking about career choice and attainment, considering various options according to one's heroes and key figures, with little reflection about the self and the environment. An occupation is commonly associated with heroes, workplaces, activities, or clothes. In children's discourses, either they do not explain how one chooses and attains a career, or provide a magical explanation (Howard & Walsh, 2011). Observable aspects are highlighted, but job requirements and qualifications are not yet considered (Howard et al., 2017). This approach can be divided into two levels—Pure Association and Magical Connection. While the first considers fantasy and simplicity, the latter marks the dawn of a cause–effect thinking about career choice and attainment. At the Pure Association level, children do not yet explain how a person chooses and attains a career. They often confuse cause and effect, and assume that a job simply exists—e.g., "Interviewer: Of all the jobs a person can get, how do they decide which job to do? Child: They go to work" (Howard & Walsh, 2010, p. 147). In the Magical Connection level, initial explanations of career choice and attainment emerge. These explanations are mainly focused on appearances, as children often associate a job with several accessories—e.g., "Interviewer: And how do they get the job of fireman? Child: When they have their own fire trucks and they have their own fire puppies, Dalmatians" (Howard & Walsh, 2010, p. 147).

In the second approach, Sequence, the cause–effect thinking is deepened by establishing concrete, temporal, or spatial steps needed for career choice and attainment. However, these steps are still presented in a straightforward, automatic,

and inflexible fashion. While developing an emerging sense of self, children tend to assign career choices to a person's preferences and/or abilities. Children also identify some events required to get a job, but in a linear sequence, such as getting a college diploma inevitably resulting in job attainment (Howard & Walsh, 2011). Two levels can be considered in the Sequence approach. The External Activities level includes the acknowledgement of potential sources of preferences and their role in career choice and attainment. Children identify some steps needed to attain a job of interest, but in an automatic way (Howard et al., 2017)—e.g., "Interviewer: How does a person get a job? Child: You have to go through all the grades and pass college and high school" (Howard & Walsh, 2010, p. 147). The Internal Processes and Capacities level includes a grasp of work demands and the consideration of one's capacities to describe career choice and attainment. Children often suggest that a job should match one's interests and capabilities (Howard et al., 2017)—e.g., "Child: I think they decide if they like the things the profession does or if they're good at something. If you're good at drawing, they could be an artist. If you like animals, you could be a vet" (Howard & Walsh, 2010, p. 147)

The third approach, Interaction, is characterized by more abstract and complex thinking, taking personal and contextual factors into account. It also includes the description of a sequence of events, potential supports, and barriers. While developing a sense of self-in-context, career choice and attainment are more realistically explained through the interaction between personal (e.g., values) and contextual factors (e.g., job availability) (Howard & Walsh, 2011). This approach can be divided into two levels—Interaction and Systemic Interaction. The Interaction level highlights inter-relations among personal and immediate contextual factors. The interaction between personal and immediate contextual factors (e.g., at the family or peer group level) is recognized in explanations of career choice and attainment (Howard et al., 2017)—e.g., "Child: How much they get paid. Whether the job is available, how far they have to drive, how hard they have to work, whether anything is wrong with the job, what kinds of people they'll work with" (Howard & Walsh, 2010, p. 148). The Systemic Interaction level considers personal, immediate, and distal contextual factors. Hence, systemic aspects (e.g., global economic situation) are added to the explanations of career choice and attainment (Howard et al., 2017). Although examples of this level have not yet been published, it seems coherent with an ethical reasoning about careers. Such reasoning is featured by the incorporation of personal, immediate, and distal environmental facets in youths' discourses, e.g., "unemployment is harming the world's economy" (Marques & Silva, 2017, p. 5).

The career thinking approaches and levels proposed by the CCCA model are aligned with evidence suggesting that individuals move from an idealistic to a realistic as well as from a self-centered to an immediate and distal contextually sensitive view of careers (Hartung et al., 2005; Howard et al., 2015; Magnuson & Starr, 2000; Marques & Silva, 2017; Watson & McMahon, 2005). Empirical support of the CCCA approaches and levels has been provided with North American children and youth, except for the Interaction last level (Howard & Walsh, 2010), which might be found only in adolescence or young adulthood. Due to human development idiosyncrasies and unique person-in-context experiences (Lerner, 2002; Vondracek et al., 2014), "even in secondary school or beyond, an individual may not reach the highest levels" (Howard et al., 2017, p. 52).

Still, there is evidence based on the CCCA protocol suggesting that older middle-school children present higher career thinking levels than younger children attending elementary or preschool (Howard & Walsh, 2010). In turn, while preschool children seem to highlight occupational props in their career reasoning, upper-elementary-school children tend to consider preferences and skills. The Sequence level is, therefore, likely to be found in upper-elementary- and middle-school children (Howard et al., 2017).

The potential of the model to sustain the evaluation of children's career-related discourses in addition to support longitudinal studies and developmentally appropriate practices has also been noticed (Howard & Walsh, 2011; Watson & McMahon, 2022; Watson et al., 2015). The CCCA model can be useful in informing career practices aimed at fostering children's career development learning (Watson & McMahon, 2022) and thinking related to career processes (Howard & Ferrari, 2022). Although research and practice tend to consider what children know about occupations and the working world, attention to how children think about career-related processes is required. By attending to children's career thinking, practitioners may help them develop a deepened understanding of the processes related to the exploration of the self and the environment, as well as the planning for various future possibilities (Howard & Ferrari, 2022). Evidence regarding the career reasoning approaches featuring different school levels (e.g., preschool, elementary school) can also enable more tailored career practices throughout the school path.

Given its scientific and practical potential, it would be useful to investigate the applicability of the CCCA model and protocol in other countries. Such an endeavor is aligned with the developmental contextualism (Lerner, 2002) rationale of the CCCA model. It is also consistent with theories recognizing the interplay between personal and contextual factors in career processes (Gottfredson, 1981; Lent et al., 1999; Savickas, 2002, 2021; Super, 1980; Vondracek et al., 2014). By examining the applicability of the CCCA model and protocol in different countries, similar and specific contextual factors shaping children's career conceptions could be identified. A contextually sensitive understanding of children's career thinking could, therefore, be developed. Additionally, more reliable inferences between career reasoning approaches and school levels could be made. Ultimately, this effort would contribute to continue strengthening partnerships to advance research and evidence-based practice on childhood career development (Watson et al., 2015). By making the CCCA protocol available in other countries, opportunities to improve research with younger children, to advance in joint international studies relying on the same assessment tools, and to inform tailored career guidance or education practices would be opened.

The present study

This study aims at examining the applicability of the CCCA protocol to European-Portuguese preschool and elementary-school children. Aligned with the CCCA model and previous evidence (Howard & Walsh, 2010, 2011; Howard et al., 2017), it was expected that an Association approach would be found in preschool and elementary-school children, whereas a Sequence approach would be found among elementary-school children, but rarely among preschool children. Hence, two research hypotheses were considered:

H1 differences between preschool and elementary-school children in career thinking levels will be found, with elementary-school children presenting higher levels (Association and Sequence approaches) than preschool children (Association approach);

H2 differences between lower- and upper-elementary-school children will be found, with upper-elementary-school children presenting higher career thinking levels (Sequence approach) than lower-elementary-school children (Association approach).

Method

Participants

A nonprobabilistic convenience sampling method was used. Inclusion criteria were holding Portuguese nationality and attending preschool or elementary school. Although the sample size for qualitative studies is still a subject of discussion, it is often suggested to take the research paradigm and saturation into account (Boddy, 2016; Vasileiou et al., 2018). Following a positivist paradigm, the recommendation to include 10–30 cases per subgroup and to attain saturation was considered (Creswell, 1998; Vasileiou et al., 2018). Hence, a minimum of ten participants per subgroup (i.e., preschool and each elementary-school year) was included, and saturation was achieved.

Participants included 101 children, 44 girls (43.6%) and 57 boys (56.4%), aged 4–10 years old [mean (*M*) 6.68, standard deviation (SD) 1.70]. The children were all European-Portuguese native speakers and attended three different public institutions—one preschool, one elementary school, and one preschool coupled with an elementary school—located in Northwest Portugal. Particularly, 39 children (38.6%; aged 4–6, $M = 4.87$, DP 0.66) attended preschool and 62 (61.4%; aged 6–10, $M = 7.882$, DP 1.02) attended elementary school[1]. In elementary school, 12 children (11.9%) attended first grade, 15 (14.9%) attended second grade, 20 (19.8%) attended third grade, and 15 (14.9%) attended fourth grade. At the time of this study, most children lived with both fathers and mothers ($n = 93$, 92.08%). Eight children (7.92%) lived with their mothers, having their parents divorced. Based on records available at schools, fathers' age ranged from 27 to 57 years old ($M = 39.06$, SD 5.34), whereas mothers' age ranged from 26 to 49 ($M = 36.69$, SD 4.64). Most fathers held high school ($n = 33$, 32.7%) or the sixth grade ($n = 27$, 26.7%) as the highest educational level attained. In turn, most mothers studied up to high school

[1] In Portugal, the last preschool year is mandatory for all children aged 5 or 6. Compulsory education includes 12 years of schooling organized in four educational levels. The first level is aligned with elementary school, the second and third levels with middle school, and the fourth level with high school. Elementary school is labeled 1st Cycle of Basic Education and includes first, second, third, and fourth grades (approximately from 6 to 9 years old). Middle school corresponds to the 2nd Cycle of Basic Education (fifth and sixth grades; approximately from 9 to 11 years old) and to the 3rd Cycle of Basic Education (seventh, eight, and ninth grades; approximately from 11 to 14 years old). High school includes 10th, 11th, and 12th grades (approximately from 14 to 17 years old).

($n = 38$, 37.6%) or the ninth grade ($n = 31$, 30.7%). Five (5%) fathers and 12 (11.9%) mothers held a college degree. Children's parents were mostly employed (84.2% fathers and 93.1% mothers). Based on the Portuguese Classification of Occupations (Instituto Nacional de Estatística, 2011), most fathers were qualified workers of industry, construction, and manufacturing or machine operators and assembly workers (55.5%); most mothers performed those same jobs or were enrolled in personal services, protection, security, and sales jobs (62.4%).

Instruments

Conceptions of Career Choice and Attainment Protocol (CCCA Protocol; Howard & Walsh, 2010)

The CCCA protocol enables the assessment of children's conceptions of and reasoning about career choice and attainment processes. This protocol was developed by Howard and Walsh (2010) and examined with North American preschool, elementary-school, and middle-school children. It was designed to be administered as a semi-structured interview, which offers researchers the flexibility to rephrase or add questions to encourage participants to explain their ideas (Fortin & Gagnon, 2016). This is consistent with the use of clarifying probes based on Piaget's "clinical method" (Piaget, 1930) following children's responses. This method enables participants to fully express their perspectives, thus granting children's right to freedom of expression and acknowledging their views in research (Graham et al., 2015).

The rationale of the protocol is the CCCA model and its integrative background encompassing literature on human development, children's career development, career decision-making processes, and phenomenological models of cognitive reasoning. The construction of the CCCA protocol followed several phases described by Howard and Walsh (2010). First, the questions were created and piloted in individual and small groups of children. Based on a thorough review of children's responses through audio records and written transcriptions, questions were reworded to improve suitability with children's linguistic abilities. Questions that were usually misunderstood by children or did not capture the intended information were deleted. Following these procedures, the CCCA protocol includes eight open-ended questions. The initial four questions evaluate children's understanding of career choice and career attainment processes (Howard & Walsh, 2010). The subsequent questions evaluate children's job aspirations, perceived requirements, and perceived personal/contextual influences to attain them (Howard et al., 2015). In this study, only the initial four questions were considered (Table 1). Hence, "the interview begins with an introductory question, and is followed by three questions that inquire about how others make career choices and pursue those choices" (Howard & Walsh, 2010, p. 145).

As the CCCA protocol has been so far used in the USA, permission was asked to its main author to translate and adapt it to European Portuguese. Based on such permission and collaboration, the CCCA protocol and Scoring System Manual (Howard

Table 1 CCCA protocol interview questions

Question	North American version	European-Portuguese version
1	When people become grown-ups they sometimes get a job. What are all the different kinds of jobs (work) that people can do?	Quando as pessoas se tornam adultas, por vezes conseguem um emprego. Quais são todos os diferentes empregos (trabalho) que as pessoas podem desempenhar?
2	How do people decide what they want to be when they grow up? Of all the jobs they can get, how do people decide which one they want? How do they decide what they want to be?	Como é que as pessoas decidem o que querem ser quando forem grandes? De todos os empregos que podem ter, como é que as pessoas decidem qual é o que querem? Como é que decidem o que querem ser?
3	Many kids wonder how grown-ups get jobs. If your friend asked you how grown-ups get jobs, what would you tell him/her? How does a person get a job?	Muitas crianças pensam sobre como é que os adultos conseguem emprego. Se um amigo teu te perguntasse como é que os adultos conseguem emprego, o que lhe dirias? Como é que uma pessoa consegue um emprego?
4	Can everyone get the job they want? (Sometimes people can't get the job they want. How come? What stops people from getting the job they want? From being what they want to be?)	Todas as pessoas conseguem o emprego que querem? Às vezes, as pessoas não conseguem o emprego que querem. Porque será que isso acontece? O que impede as pessoas de conseguir o emprego que querem? De ser o que querem ser?

& Walsh, 2010) were translated from English to European Portuguese. The protocol and the Scoring System Manual were back-translated from European Portuguese to English by a professional translator with no previous knowledge of the original materials. The back-translated versions of the CCCA protocol and Scoring System Manual were returned to their main author to assure that the original meaning and content were preserved. No changes were required. The European-Portuguese version of the CCCA protocol was piloted in individual interviews with four children, one boy and one girl attending preschool plus one boy and one girl attending elementary school. Based on this pilot phase, no changes were made to the CCCA protocol, as children appeared to understand the questions and made no suggestions for revisions.

Procedures

The board of the educational institutions authorized their collaboration in the study, after brief presentation of its purpose. A written consent form was delivered to the children's parents, asking their permission to consult sociodemographic records available at schools and for their children to answer the semi-structured interview. Based on this procedure, 97% of the children's parents granted their consent. Having obtained their written consent forms, the study was explained to the children, and their verbal assent was obtained. Children's informed decision as to either participate or not in this study was, therefore, considered (Graham et al., 2015). Children who agreed to participate did so voluntarily and without expecting any material reward.

Data were collected by two interns, under the scientific supervision of the first author. During their master's academic training, the interns studied the theoretical and empirical literature on childhood career development and were trained in the CCCA protocol. Upon obtaining parental consent and children's assent, records available at schools were consulted for sociodemographic background. Children were individually interviewed by one of the interns in a private room available at the school settings. Children took an average of 5 min to respond to the CCCA protocol. Each child's response to the interview was audio-recorded by the interviewer. All interviews were transcribed by the interns who collected the data. The resulting audio and written files were coded with an Arabic number and educational level to protect the children's identity. Confidentiality was guaranteed throughout this study, in accordance with the Code of Ethics from the Portuguese Order of Psychologists (2011), and the APA Ethical Principles of Psychologists and Code of Conduct (2017).

Data analyses

The CCCA Scoring System Manual[2] was initially studied by two Portuguese raters, with the collaboration of the CCCA original author. Both Portuguese raters were

[2] The CCCA Scoring System Manual is composed of two sections. The first section describes the CCCA model and protocol rationale. The second section explains how to score interviews coupled with sample responses for each career reasoning level.

trained in educational psychology, held doctoral degrees in career counseling and development, had previously worked with scoring systems, were employed in higher-education institutions, and continued to serve the community as career counselors. The CCCA original author was trained in counseling psychology, holds a doctoral degree in this field, specializes in career development research, is employed in an institution of higher education, and provides support to K–12 schools around career development programming. Both Portuguese raters engaged in a prerating training oriented by the author of the original North American CCCA Protocol and Scoring System. The prerating training included recommendations to practice scoring of nine interviews offered by the author of the original CCCA Protocol and Scoring System versions.

The rating of the 101 interviews collected in this study began as soon as the author of the North American CCCA Protocol and Scoring System considered that both raters mastered with reliability the scoring system. The overall responses from a child constituted the unit of analysis and one career thinking level was assigned to each interview. The identification of causes and the explanation of how such causes may lead to the choice and attainment of a job/career were taken as the main elements to score a career reasoning level. Differentiation of cause and effect, of external and internal locus of causes, and of single and complex inter-related causes contributing to career choice and attainment were key components informing the scoring of career reasoning levels. These components were, therefore, considered when analyzing each child's full response to an interview. Each interview was assigned one rating representing the level of global reasoning about career choice and attainment. The Association approach included scores 1 "Pure Association level" and 2 "Magical Connection level." The Sequence approach included scores 3 "External Activities level" and 4 "Internal Processes and Capacities level." The Interaction approach included scores 5 "Interaction" and 6 "Systemic Interaction." All the interviews were independently scored by the raters. When four interviews were independently rated, results were compared between raters and discussed with the original author of the CCCA whenever discrepancies occurred. This procedure continued until all interviews were scored. A Cohen's kappa inter-rater reliability value of 0.82 was obtained, thus suggesting an excellent level of agreement among the independent raters (Landis & Koch, 1977).

Children's main sociodemographic information and scored global career reasoning level were saved in a data file from the Statistical Package for the Social Sciences (SPSS), version 25.0 for Windows. Descriptive statistics was used to examine the distribution of participants per coded CCCA level. Nonparametric Mann–Whitney and Kruskal–Wallis tests were computed to investigate the effect of educational level (i.e., preschool versus elementary school; preschool versus first, second, third, and fourth grade of elementary school, respectively) on the career reasoning levels (ordinal dependent variable). Facing statistically significant results from the Kruskal–Wallis test, additional Mann–Whitney tests with Bonferroni correction were conducted (Field, 2018).

Table 2 Distribution of conceptions of career choice and attainment per educational level

Educational level	Pure association *n* (%)	Magical connection *n* (%)	External activities *n* (%)
Preschool	30 (76.9)	9 (23.1)	
Elementary school	12 (19.4)	25 (40.3)	25 (40.3)
1st grade	4 (33.3)	6 (50)	2 (16.7)
2nd grade	3 (20)	6 (40)	6 (40)
3rd grade	3 (15)	7 (35)	10 (50)
4th grade	2 (13.3)	6 (40)	7 (46.7)
Total	42 (41.6)	34 (33.7)	25 (24.8)

Results

Descriptive results suggested that preschool children present an Association level of career reasoning, while elementary-school children present career reasoning at both the Association and Sequence levels (Table 2). Most of the preschool children's conceptions of career choice and attainment were scored at the Pure Association level (76.9%). In turn, the conceptions of elementary-school children were mostly scored at the Magical Connection Association level (40.3%) and at the External Activities Sequence level (40.3%). Examples of interview responses from the three levels—Pure Association, Magical Connection, and External Activities—are presented in Table 3.

Mann–Whitney test results suggested that elementary-school children were more likely to engage in higher levels of reasoning regarding career choice and attainment than preschool children, $U = 400.50$, $p < 0.001$ (Table 4).

Kruskal–Wallis test results indicated statistically significant differences between preschoolers, first, second, third, and fourth graders on career reasoning, $\chi^2(4) = 39.66$, $p < 0.001$ (Table 5). Additional Mann–Whitney tests with Bonferroni correction ($0.05/10 = 0.005$) suggested that elementary-school children, regardless of their grade, presented higher levels of reasoning regarding career choice and attainment than preschool children. No differences were found among children attending different elementary-school grades (Table 6).

Discussion

This study sought to analyze the applicability of the CCCA protocol to Portuguese preschool and elementary-school children. After completing the translation, adaptation, and piloting of the materials, the CCCA protocol was used with Portuguese children in school-based settings. Overall, the results suggest that the CCCA protocol can be used in another country and particularly enables the differentiation of career reasoning approaches and levels among Portuguese children.

This study offered evidence to support H1, as elementary-school children presented higher career thinking levels than preschool children. While preschool

Table 3 Examples of interview responses per level

Association approach—Pure Association level
Entrevistador: Como é que as pessoas decidem o que querem ser quando forem grandes? De todos os empregos que podem ter, como é que as pessoas decidem qual é o que querem ser?
Criança: Com a cabeça. Pensam.
Entrevistador: Muitas crianças pensam sobre como é que os adultos conseguem emprego. Se um amigo teu te perguntasse como é que os adultos conseguem emprego, o que lhe dirias? Como é que uma pessoa consegue um emprego?
Criança: Não sei.
Interviewer: How do people decide what they want to be when they grow up? Of all the jobs they can get, how do people decide which one they want?
Child: With their heads. They think.
Interviewer: Many kids wonder how grown-ups get jobs. If your friend asked you how grown-ups get jobs, what would you tell him/her? How does a person get a job?
Child: I don't know.

Association approach—Magical Connection level
Entrevistador: De todos os empregos que podem ter, como é que as pessoas decidem qual é o que querem? Como é que decidem o que querem ser?
Criança. A minha prima disse-me que queria ser cozinheira. Eu quero ser cabeleireira.
Entrevistador: E como decidiste isso?
Criança: Preciso de secar o cabelo, de coisas para fazer caracóis, de coisas de pinturas se quiser pintar o cabelo às pessoas, preciso de coisas para fazer tranças, que é borrachas, de coisas para esticar o cabelinho.
Entrevistador: Como é que uma pessoa consegue um emprego? Como conseguirias o emprego de cabeleireira?
Criança: Dizia...
Interviewer: Of all the jobs they can get, how do people decide which one they want? How do they decide what they want to be?
Child: My cousin said she wants to be a cook-person. I want to be a hairdresser.
Interviewer: How did you decide that?
Child: I need to dry the hair, things to make curls, paint material if I want to dye people's hair, I need things to make braids, which are rubber bands, things to straighten the hair.
Interviewer: How does a person get a job? How would you get the hairdresser job?
Child: I would say so…

Sequence approach—External Activities level
Entrevistador: Muitas crianças pensam sobre como é que os adultos conseguem emprego. Se um amigo teu te perguntasse como é que os adultos conseguem emprego, o que lhe dirias? Como é que uma pessoa consegue um emprego?
Criança: Explicava se tiver boas notas, muito bom comportamento e respeitar os colegas, consegue.
Entrevistador: Todas as pessoas conseguem o emprego que querem? Às vezes, as pessoas não conseguem o emprego que querem. Porque será que isso acontece? O que impede as pessoas de conseguir o emprego que querem? De ser o que querem ser?
Criança: Não. Porque às vezes, as pessoas têm más notas e não conseguem aquilo que querem.
Interviewer: Many kids wonder how grown-ups get jobs. If your friend asked you how grown-ups get jobs, what would you tell him/her? How does a person get a job?
Child: I say if you have good grades, good behavior and respect your colleagues, you can get it.
Interviewer: Can everyone get the job they want? Sometimes people can't get the job they want. How come? What stops people from getting the job they want? From being what they want to be?
Child: No. Because sometimes people have bad grades and they do not get what they want.

children presented an Association approach to career reasoning, elementary-school children presented both an Association and a Sequence approach to career reasoning. These findings are aligned with the CCCA model and evidence suggesting that

Table 4 Comparison of preschool and elementary-school children on career reasoning

	Preschool children ($n = 39$) Mean rank	Elementary-school children ($n = 62$) Mean rank	U
Career reasoning	30.27	64.04	400.50***

***$p < 0.001$

Table 5 Comparison of preschool, first, second, third, and fourth grade children on career reasoning

	Preschoolers ($n = 39$) Mean rank	1st graders ($n = 12$) Mean rank	2nd graders ($n = 15$) Mean rank	3rd graders ($n = 20$) Mean rank	4th graders ($n = 15$) Mean rank	χ^2 (4)
Career reasoning	30.27	51.75	63.70	68.55	68.20	39.66***

***$p < 0.001$

preschoolers highlight observable occupational features and external factors in their career reasoning, whereas elementary-school children integrate internal factors in explanations of career choice and attainment (Howard & Walsh, 2010; Howard et al., 2017). These results are also consistent with extant research suggesting developmental progress from idealistic and self-centered to increasingly realistic and contextually sensitive conceptions of careers during childhood (Hartung et al., 2005; Howard et al., 2015; Magnuson & Starr, 2000; Watson & McMahon, 2005).

In addition, although elementary-school children presented both an Association and a Sequence career reasoning approach, no differences were found by grade level within the elementary-school years. Hence, H2 was not supported. Three main possibilities can be considered to understand these results. First, because children experience unique person-in-context interactions and developmental rhythms (Hartung et al., 2005; Howard & Ferrari, 2022; Peila-Schuster, 2018; Vondracek et al., 2014), shifts between the approaches and levels likely occur at different times for them, thereby yielding no group differences. Future longitudinal studies could address between- and within-person level differences on career reasoning developmental trajectories. Such studies could also explore whether career reasoning approaches present a nonlinear increase, with a more accentuated initial increase from preschool to elementary school and a more gradual increase in elementary school. Second, as elementary-school years span the transition from a preoperational stage (approximately from 2 to 7 years old) to a concrete operations stage (approximately from 7 to 11 years old) of cognitive development, variations in cognitive development and career reasoning may be linked. In the preoperational stage, children's reasoning is marked by fantasy and a focus on concrete and observable aspects, which is compatible with the Association approach. In the concrete operations stage, children's thinking becomes more logical and organized, which resembles the Sequence approach (Howard & Walsh, 2011). As reciprocity among cognitive and career development is expected (Gottfredson, 1981; Howard & Walsh, 2011), varying rhythms in the transition from the preoperational to the concrete operations stage

Table 6 Results from Mann–Whitney tests with Bonferroni correction

	Preschoolers versus 1st graders	Preschoolers versus 2nd graders	Preschoolers versus 3rd graders	Preschoolers versus 4th graders	1st graders versus 2nd graders	1st graders versus 3rd graders	1st graders versus 4th graders	2nd graders versus 3rd graders	2nd graders versus 4th graders	3rd graders versus 4th graders
Career reasoning	*	***	***	***	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.

*$p < 0.05$. ***$p < 0.001$

of cognitive development can be tied to varying shifts from an Association to a Sequence approach. Future studies could, therefore, examine reciprocal relations between career reasoning approaches/levels and other human development domains, namely cognitive development. Third, these findings may also be illustrative of the fact that, although the curricular contents are different across the elementary-school years, Portugal does not yet intentionally promote children's career development, nor has it adopted a systematic strategy of promoting career development throughout individuals' academic path. Additional research-action efforts could be useful to stimulate the implementation of career practices in Portuguese elementary schools and to test their impact on children's career reasoning.

Despite the contribution of this study applying the CCCA protocol to Portuguese children, two main limitations are worth mentioning. First, this study relied on a sample of preschool and elementary-school children from Northwest Portugal and whose parents generally held limited qualifications. Future studies covering children from various geographic areas of Portugal and holding both limited, intermediate, and high qualifications would be useful to deepen the analysis of the CCCA protocol's applicability to Portuguese children with a more representative sample. Second, there was a relatively unbalanced distribution of preschool and elementary-school children in this sample. Although the nonparametric tests herein used are consistent with the variables and sample size, it would be important for future studies to increase the size of the sample and to include a more balanced distribution of children across school levels. In this regard, it would be important to keep studying the applicability of the CCCA protocol to Portuguese individuals, including also middle-school children, and exploring additional differences for preschool, elementary-school, and middle-school students. Various developmental changes occur during middle school, such as advancing to the formal operations stage of cognitive development, considering proximal and distal influences in career development, and increasing the number of academic subjects and teachers (Howard & Walsh, 2011; Howard et al., 2015; Marques & Silva, 2017). It is plausible that such variations follow developmental progress in career reasoning (Howard & Walsh, 2010). This possibility could additionally be examined through comparative studies with a relatively balanced distribution of preschool, elementary-school, and middle-school children.

Implications for research and practice

This study supports the use of the CCCA protocol with Portuguese children, which opens possibilities for future research. For example, this work might stimulate other studies to continue exploring the use of the protocol with Portuguese children. It might also inspire research to test the applicability of the CCCA protocol with children from other Portuguese-speaking countries, such as Brazil or Mozambique. Further, the potential of the CCCA model and protocol to support childhood career development research and practice have been internationally acknowledged (Watson & McMahon, 2022). Relying on collaborative international research efforts, other countries could advance the translation, adaptation, and use of the CCCA protocol.

Such work would contribute to ongoing advances in the field and might ultimately create conditions to support future transcultural studies (Watson et al., 2015). It would also be aligned with calls to identify and (quantitatively and/or qualitatively) assess the main constructs and processes of childhood career development, thus supporting ongoing collaborative work in the field (Hartung et al., 2005; Oliveira et al., 2017; Watson & McMahon, 2022).

As career development can be conceived as a dimension of human development (Gottfredson, 1981; Peila-Shuster, 2018; Super, 1980; Vondracek et al., 2014), future studies could also examine associations of children's career thinking with other developmental constructs, such as perspective-taking, moral reasoning, or cognitive performance. Longitudinal studies could additionally be useful to investigate interrelated changes among these processes from preschool through elementary and middle school, as well as throughout the lifespan (Hartung et al., 2005; Savickas, 2002; Super, 1980). Such studies could help identify similarities and idiosyncrasies in developmental paths, which could help deepen our understanding of childhood career development (Vondracek et al., 2014; Watson & McMahon, 2022). Associations between children's career thinking and other career development constructs, namely career exploration, career awareness, vocational aspirations and expectations, career preferences, and career adaptability (Hartung et al., 2005) could also be investigated. In addition, research could explore personal and contextual factors of children's conceptions of career choice and attainment. As factors like gender, ethnicity, social-economic environment, parents' work experiences and affectivity, or school climate seem to influence children's career development (Araújo & Taveira, 2009; Gottfredson, 1981; Hartung et al., 2005; Oliveira et al., 2017; Super, 1980; Vondracek et al., 2014; Watson & McMahon, 2005), future studies could analyze the role of such factors on children's career thinking. Although research linking career and academic processes is still scarce (Oliveira et al., 2017; Watson & McMahon, 2022), future studies could also investigate if student-centered pedagogical practices and teaching methods might influence children's occupational knowledge, career exploration, and conceptions of career choice and attainment.

As for practice, by affirming the applicability of the CCCA protocol to Portuguese children, this study contributes to the availability of tools that might be used to assess children's career development in Portugal. As is common at an international level (Briddick et al., 2018; Stead et al., 2017), practitioners in Portugal have been primarily using quantitative assessment procedures and have focused on adolescence. Hence, the availability of tools to assist a more comprehensive and mixed-method assessment of children's career development is important to advance both career research and practice in the country. This study might stimulate career researchers and practitioners from Portugal and other world areas to describe the career development of children, to plan for promotional practices, to evaluate their efficacy, and to follow developmental changes over time. The expansion of available assessment tools might additionally be advantageous to the training of future career practitioners. Training opportunities could not only deepen knowledge on childhood career development, but also address its inter-relation with other developmental domains, contexts, and possibilities for assessment and intervention.

In this regard, the CCCA model holds potential to guide developmentally appropriate practices (Howard & Walsh, 2010, 2011). For example, career practices in preschool need to be aligned with an Association approach to career choice and attainment. They may consist of offering opportunities (e.g., through play, field trips) for children to start understanding the world of work, identifying various occupations, their related tools, activities, and settings (Howard et al., 2017). On the other hand, practices in elementary school need to be aligned with progress from an Association to a Sequence career reasoning approach. They may involve opportunities (e.g., through job shadowing, interaction with key figures/speakers) for children to understand the importance of setting goals and plan actions to attain them, as well as to meet career narratives (Howard et al., 2017). Both direct practices with children and indirect practices with preschool and elementary-school teachers might be intentionally mobilized to promote children's career development, self-awareness, and increasingly sophisticated career reasoning (Howard et al., 2017; Magnuson & Starr, 2000; Watson & McMahon, 2022). Direct and indirect practices are promising due to their consistency with an integrative and contextually sensitive view of children's career development (Araújo & Taveira, 2009; Briddick et al., 2018; Peila-Shuster, 2018; Vondracek et al., 2014).

Author contributions All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed by Íris M. Oliveira and Cátia Marques. The first draft of the manuscript was written by Íris M. Oliveira, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Funding Open access funding provided by FCT|FCCN (b-on). This study was supported by the Portuguese Foundation for Science and Technology: Centre for Philosophical and Humanistic Studies (UID/FIL/00683/2020); Psychology Research Centre (UIDB/01662/2020).

Data availability Not applicable.

Code availability The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

Ethical approval Confidentiality was guaranteed throughout this study. Additional ethical research considerations were assured relying on the Code of Ethics from the Portuguese Order of Psychologists (2011), and on the APA Ethical Principles of Psychologists and Code of Conduct (2017).

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