The Studyamo Test: Development of an Online RIASEC-Based Self-Assessment Instrument for Study Orientation

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Abstract

Choosing an appropriate field of study represents a complex and often overwhelming decision for many prospective students. Online self-assessment tools can support the study orientation process by matching individual interests with study programs and related occupational fields, thereby generating study recommendations. Against this background, the present paper describes the development of the Studyamo Test, a newly developed interest inventory based on Holland's theory of career choice and the associated RIASEC model. The RIASEC model conceptualizes vocational interests along six dimensions—Realistic, Investigative, Artistic, Social, Enterprising, and Conventional—and provides a structured framework for linking individual interest profiles to educational pathways and occupational environments. To examine the structural properties and psychometric characteristics of the instrument, several analytical approaches were applied, including item analysis, multidimensional scaling (MDS), factor analysis, and circumplex testing. The results indicate a largely consistent structural representation of the RIASEC model and overall satisfactory measurement properties of the instrument.

Keywords: vocational interests, RIASEC model, interest inventory, online self-assessment, study orientation

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The career development is a long and complex process (Adigüzel et al., 2014) that begins during the school years. After completing school, individuals must decide whether to continue their education, for example by pursuing an academic degree, or to enter the workforce (Dumfart et al., 2016). In academic professions, the search for suitable employment begins with the selection of a field of study (Abel, 1998). This decision-making phase is perceived by most prospective students as difficult and overwhelming (Heine et. al, 2010, as cited in Stoll, 2019), as people differ in how differentiated their vocational interests are. Individuals with poorly developed interests often face the challenge of committing to a study program despite perceiving few attractive alternatives. In contrast, those with well-developed and specific interests are confronted with the difficulty of choosing one attractive option while foregoing several other appealing possibilities (Höft & Hell, 2014).

Since reflecting on one's own interests is a crucial factor for adolescents in making well-founded decisions about higher education and career paths (Taquya et al., 2024), which always require considering a range of options (Bullock, 2008), focusing on these personality characteristics can help support prospective students during the transition from school to university (Ahmed et al., 2019).

This exact relationship between personal interests and career choice is described by Holland's (1997) theory of career choice and the RIASEC model derived from it.

Numerous scholarly discussions have examined the basis and criteria on which career paths are determined (Adigüzel et al., 2014). In this context, Holland's theory has proven to be particularly useful (Bullock et al., 2018). It is considered as one of the most well-known theory of career choice and is used by researchers and practitioners worldwide (Hartmann et al., 2021).

It has been suggested that no other career theory exhibits a similar breadth of scholarly influence (Kennelly et al., 2018), as it is among the most influential and most extensively researched psychological theories (Bergmann, 1998; Joerin Fux, 2006).

The fundamental assumptions proposed by Holland have been empirically supported in numerous studies (Bergmann, 1998).

Holland's theory is not limited to the field of career choice. „The applications cited for career assistance also apply to education. The diagnostic and treatment ideas can be applied at all levels of education“ (Holland, 1997, p. 214).

Beyond cognitive achievement and family background, vocational interests—such as those described in Holland's RIASEC model—have been identified as important personality-related factors influencing educational track decisions (Usslepp et al., 2020). Corresponding interest inventories are widely used and well accepted in educational and career counseling contexts (Höft & Hell, 2014), and despite its long-standing history, Holland's model continues to demonstrate sustained relevance in contemporary career development research (Ruff et al., 2007).

Many existing assessment instruments for RIASEC interests are adaptations of Holland's Self-Directed Search (SDS) (Ambiel et al., 2018). Tests such as the SDS can also be used by individuals who do not have an educational or career counselor (Srsic et al., 2001), because it „…simulates what a practitioner and an individual might do together in a counseling session (e.g., review preferred activities and occupations, and review competencies and abilities)“ (Dozier et al., 2013, p. 67).

Such established assessment procedures are generally subject to licensing restrictions, which for economic and legal reasons prevent their straightforward integration into proprietary websites or their provision as part of in-house services.

Accordingly, such applications require the development of proprietary assessment instruments. Against this background, a proprietary test based on the RIASEC model was developed for the internationally oriented website https://www.studyamo.com , which supports prospective students in choosing a field of study.

Designed as a self-assessment tool, the Studyamo Test is conceptually aligned in certain aspects with established forced-choice approaches to interest assessment in the RIASEC context (e.g., Stangl, 2025a, 2025b), while following an independent design. It consists of two modules and, based on the identified interest profile, provides a study recommendation in the form of a ranking of 143 different fields of study.

The aim of this study is to present the development of the test and to examine its psychometric properties.

Theoretical Background and State of Research

Holland developed his theory of career choice on the basis of scientific questions dating back to 1928, and he sought to limit the application of the theory to simple, cost-effective, and practical definitions and measures (Holland, 1997). The theory is easy to explain, apply, and understand, and it can be evaluated empirically (Thamrin et al., 2023).

Holland’s RIASEC model helps identify a fit between an individual’s characteristics and their occupational environment (Schreiber et al., 2016), as a person’s interest orientations are also reflected in environmental types from which individuals select those they find most appealing (Hatzglos, 2009).

The theory posits that, in order to achieve satisfaction and success, individuals should choose work environments that match their interests (Hartmann et al., 2021), because only when the person and the workplace are well aligned will the individual value the work, continue to develop, and experience a sense of satisfaction (Ramandeep et al., 2021).

The model developed by Holland is suitable for grouping occupations according to their psychological characteristics and requirements and for identifying the personality traits associated with performance and success in specific occupations (Anderson et al., 2006). Fortis (2019, p. 32) states that, „…a process of choosing a profession is a process of evolving interests and personality differentiation, which at the stage of decision-making leads to the specific favoring of one occupational group of the six professional groups set”.

That personality dimensions and RIASEC types are indeed related from a theoretical perspective has been confirmed in numerous studies (Batista & Gondim, 2023).

Holland (1997) characterizes the six RIASEC personality types based on occupational and non-occupational interests, life goals and values, self-beliefs, problem-solving styles, and traits derived from these parameters (see Table 1 for a summary).

Table 1

RIASEC Personality Types According to Holland

Realistic (R): Prefers activities involving objects, tools, machines, or animals. Develops manual, mechanical, agricultural, and technical skills. Vocational and avocational Preferences: Prefers realistic activities or situations. Avoids activities associated with social professions. Has a narrow range of interests. Life goals and values: Holds traditional values, values independence, prefers institutional structure, is ambitious, shows a high degree of self-control, and is practically oriented. Possesses a closed system of values and beliefs. Self-beliefs: Recognizes mechanical, technical, and athletic abilities in oneself. Enjoys working with hands and machines, tends to have lower self-esteem, but is confident in one's abilities. Problem solving style: Uses realistic beliefs, values, and skills to solve problems. Prefers concrete, practical, and structured solutions or strategies. Traits: Conforming, dogmatic, genuine, hardheaded, inflexible, materialistic, natural, normal, persistent, practical, realistic, reserved, robust, self-effacing, uninsightful.
Investigative (I): Prefers activities that involve the observational, symbolic, systematic, and creative exploration of physical, biological, and cultural phenomena. Develops scientific and mathematical skills. Vocational and avocational Preferences: Prefers investigative activities or situations. Avoids activities associated with enterprising professions. Life goals and values: Values scientific activity, independence, and personal attributes such as intellectualism, logic, and ambition. Holds liberal goals and values and is open to new ideas and experiences. Has a broad range of interests. Self-beliefs: Recognizes scientific, research-oriented, and mathematical abilities in oneself. Describes oneself as analytical. Sees oneself as curious, academically oriented, and broadly interested. Has moderate to high self-esteem. Problem solving style: Uses investigative beliefs, skills, and values to solve problems. Relies on thinking, information gathering, analysis, and objective data. Pays less attention to personal feelings or the social environment. Traits: Analytical, cautious, complex, critical, curious, independent, intellectual, introspective, pessimistic, precise, radical, radical, rational, reserved, retiring, unassuming.
Artistic (A): Prefers diverse, free, and unstructured activities and manipulates human materials to create art forms or products. Develops artistic skills. Vocational and avocational Preferences: Prefers artistic activities or situations. Avoids conventional activities. Life goals and values: Values aesthetic experience and achievement, as well as personal qualities such as imagination and courage. Is highly open to emotions, ideas, and other people. Holds liberal ideals and values. Self-beliefs: Sees oneself as expressive, open, original, intuitive, liberal, nonconforming, introspective, independent, disorganized, and artistically gifted. Problem solving style: Uses artistic beliefs, skills, and values to solve problems. Perceives problems within an artistic context. Artistic talents and characteristics such as intuition, expressiveness, and originality dominate the problem-solving process. Traits: Complicated, disorderly, emotional, expressive, idealistic, imaginative, impractical, impulsive, independent, introspective, intuitive, nonconforming, open, original, sensitive.
Social (S): Prefers activities that involve interaction with others in order to inform, support, educate, heal, or counsel them. Develops skills in human relations. Occupational and non-occupational preferences: Prefers social activities or situations. Avoids activities associated with the realistic type. Life goals and values: Values social and ethical activities and issues. Seeks to serve others. Believes in the equality of all people and in the desirability of being helpful and tolerant. Self-beliefs: Sees oneself as helpful and understanding and recognizes pedagogical and social skills in oneself. Has moderate self-esteem. Problem solving style: Uses social beliefs, skills, and values to solve problems. Problems are often viewed from the perspective of interpersonal relationships. Social skills and characteristics such as seeking interaction and seeking help from others dominate the problem-solving process.

Traits: Agreeable, cooperative, empathetic, friendly, generous, helpful, idealistic, kind, patient, persuasive, responsible, sociable, tactful, understanding, warm.

Enterprising (E): Prefers activities that involve influencing others in order to achieve organizational goals or economic gains. Develops leadership skills, interpersonal skills, and persuasiveness.
Vocational and avocational Preferences: Prefers enterprising activities or situations. Avoids investigative activities.
Life goals and values: Holds traditional values, such as economic and political achievement. Values control over others, the ability to free oneself from external control, and is ambitious. Has a high level of self-confidence and strives for leadership roles.
Self-beliefs: Perceives oneself as aggressive, popular, self-confident, sociable, and articulate, and recognizes one's own leadership qualities.
Problem solving style: Uses enterprising beliefs, skills, and values to solve problems. Problems are often viewed from the perspective of social influence. Traditional values and control over others dominate the problem-solving process.
Traits: Acquisitive, adventurous, ambitious, assertive, domineering, energetic, enthusiastic, excitement-seeking, exhibitionistic, extroverted, forceful, optimistic, resourceful, self-confident, sociable.

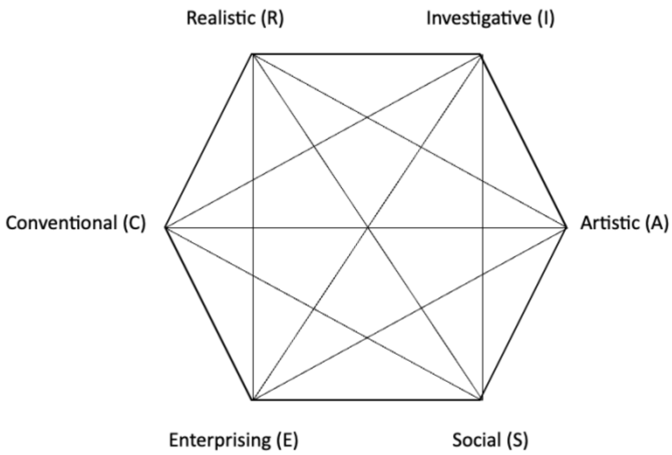
Conventional (C): Prefers activities or situations that involve the clear, orderly, and systematic handling of data. Works well with people who share similar attitudes and interests.
Vocational and avocational Preferences: Prefers conventional activities or situations, such as accounting or banking. Avoids activities associated with the artistic type.
Life goals and values: Values business and economic achievement. Possesses expertise in finance or commerce, strives for a comfortable life, and nevertheless aims for high work performance. Values are characterized by traditional virtues. Has a very closed value system.
Self-beliefs: Perceives oneself as rule-abiding and orderly. Recognizes a high level of administrative, numerical, and economic skills. Has low self-esteem.
Problem solving style: Uses conventional beliefs, skills, and values to solve problems. Follows established rules, practices, and procedures. Seeks advice from authority figures, looks for practical solutions, and emphasizes careful planning.
Traits: Careful, conforming, conscientious, dogmatic, efficient, inflexible, inhibited, methodical, obedient, orderly, persistent, practical, thorough, thrifty, unimaginative.

Note. Summary based on Holland (1997, pp. 21–28). Descriptions are abbreviated and partly adapted; selected terminology follows the original source.

Holland arranges these six personality types within the hexagonal RIASEC model (see Figure 1). In this model, psychologically similar dimensions are positioned next to each other, while less similar dimensions are placed farther apart. According to Holland (1997), the shorter the distance between two types, the greater their psychological similarity.

Figure 1

Holland’s Hexagonal Model



Note. Reproduced from Holland (1997)

Holland (1997 pp. 1–4) formulates four key assumptions of his theory as follows:

- In our culture, most persons can be categorized as one of six personality types: Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising(E) or Conventional(C).
- Correspondingly, six types of environments (R, I, A, S, E, C) can also be distinguished.
- “People search for environments that will let them exercise their skills and abilities, express their attitudes and values, and take on agreeable problems and roles.” They seek environments that match their personality orientations.
- A person’s behavior is determined by the interaction between their personality and the environment. If both personality and environmental structure are known, individual interaction outcomes can be predicted such as educational or career choice, as well as occupational adjustment and performance.

In addition to the four central assumptions of the model, Holland introduced several secondary concepts—consistency, differentiation, identity, congruence, and calculus—that apply to both individuals and environments. These concepts serve to moderate or qualify predictions and explanations derived from the main concepts (Holland, 1997).

Holland (1997, pp. 7–11) also outlines several background principles of his model:

- “The choice of a vocation is an expression of personality.”
- “Interest inventories are personality inventories.”
- “Vocational stereotypes have reliable and important psychological and sociological meanings.”
- “The members of a vocation have similar personalities and similar histories of personal development.”
- “Because people in a vocational group have similar personalities, they will respond to many situations and problems in similar ways, and they will create characteristic interpersonal environments.”
- “Vocational satisfaction, stability, and achievement depend on the congruence between one´s personality and the environment in which one works.”

Since Holland’s RIASEC theory was developed in response to the occupational needs of people in the United States in the mid-twentieth century (Bullock, 2018), it cannot be assumed automatically that the model is equally valid in cultures and countries other than the United States (Toit & Bruin, 2002).

When English-language psychometric instruments designed for use in Western contexts are applied in non-English-speaking settings, translation issues may arise, and cultural factors may also become salient, potentially affecting the interpretation of the results (Aljojo & Saifuddin, 2017).

Empirical studies have indeed identified indications that justify a cautious application of Holland’s theory in certain areas (Bullock et al., 2018; Martončik et al., 2020).

According to Holland (1997, as cited in De Fruyt & Mervielde, 1999), despite such concerns, the RIASEC model has generated international interest among researchers and practitioners. Numerous attempts have been made to apply it in many regions around the world, and even in times of globalization and rapid societal change it continues to be regarded as a promising framework (Bullock et al., 2018).

Accordingly, Kenelly et al. (2018) identified 2,318 distinct references to Holland's RIASEC theory across 355 publications between 1953 and 2016, with many of these appearing in some of the most rigorous and prestigious journals in the field of vocational behavior and career development.

Between 2006 and 2016 alone, references to RIASEC were identified in 32 countries and across 71 ethnic groups (Kennelly et al., 2018). Empirical studies indicate that Holland's theory corresponds closely with personality types identified in many regions worldwide (Adigüzel et al., 2014).

With regard to the applicability of the RIASEC model to adolescent samples, research has found a significant relationship between RIASEC personality characteristics and career preferences (Ahmed et al., 2019), and shown that the RIASEC model accurately represents students' vocational interests (Nistal et al., 2019; Taquyah et al., 2024). Other studies, however, suggest a general correspondence with the RIASEC ordering but not with the underlying circular RIASEC model itself (Martončik et al., 2020).

Longitudinal research indicates that vocational interests become increasingly stable during late childhood and early adolescence, while mean interest levels initially decline and gender differences become more pronounced (Gfrörer et al., 2022).

Further empirical evidence suggests that the stability of vocational interests generally increases over the course of adolescence. In addition, gender differences emerge, with female adolescents showing more stable interest profiles than males (Gfrörer, 2021).

Low et al. (2005), in a meta-analysis examining the stability of vocational interests from early adolescence (age 12) to middle adulthood (age 40), report a marked increase in interest stability between approximately ages 18 and 21, after which stability remains relatively high throughout adulthood.

Tracey and Rounds (1995) demonstrated with samples of high school and college students that vocational interests follow a uniform circular distribution. Their findings indicate that the RIASEC model represents only one of several possible ways of scaling this circular structure.

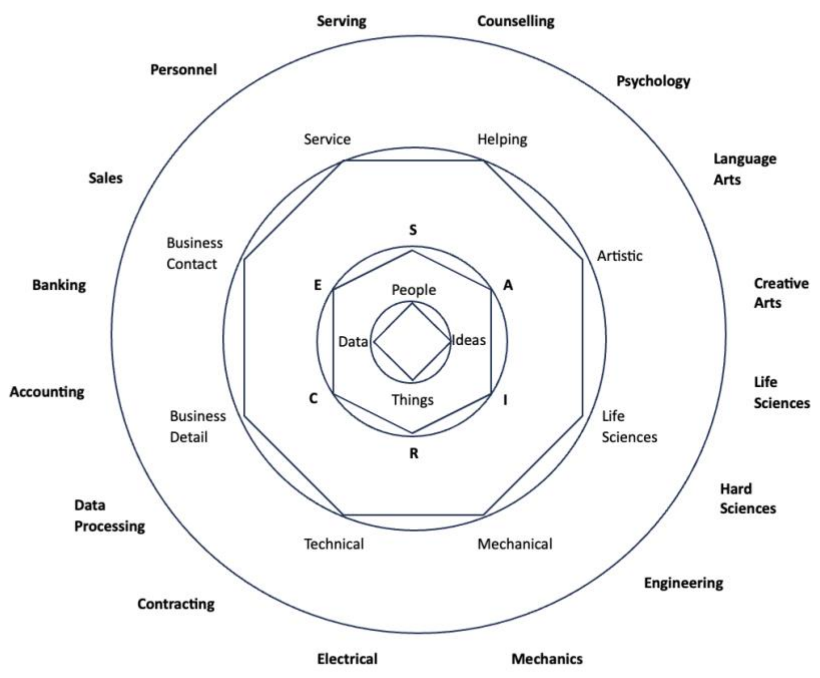
Tracey and Rounds (1995) describe an eight-scale representation of vocational interests that differentiates several RIASEC domains, such as splitting Social interests into helping and service and expanding Investigative and Realistic interests into life science, mechanical, and technological areas. This finer segmentation of the interest circle may make interest groupings easier to understand.

As shown in Figure 2 Tracey and Rounds (1995) illustrate how different representations of vocational interests can be understood as alternative ways of partitioning the same circular structure. Their model includes representations with varying levels of complexity, such as Prediger's (1982, as cited in Tay et al., 2011)) People–Things and Data–Ideas dimensions, Holland's RIASEC model, and an eight-scale representation of interests.

When interests are viewed in the concentric manner illustrated in Figure 2, different logical levels of information about vocational interests can be integrated.

Figure 2

Concentric Representation of Vocational Interests



Note. Reproduced from Tracey & Rounds (1995)

In summary, it can be concluded that Holland's theory of career choice is scientifically recognized and well supported by empirical evidence. The theory has a positive track record and has been successfully applied internationally for a considerable period of time and continues to be widely used to this day. Moreover, its applicability is not limited to career choice alone but also extends to decisions regarding educational and training pathways.

Development of the Studyamo Test

Objectives of the Test

The present study introduces the Studyamo Test, an online-based self-assessment instrument designed to support study choice decisions based on Holland's theory of career choice and the RIASEC model derived from it. Self-assessments are online tools that prospective students voluntarily access and complete on their own (Vent et al., 2009). Previous experiences with self-assessments have been largely positive and suggest that they can support prospective students in making informed study choices (Heukamp et al., 2009).

The objective of the Studyamo Test is to support prospective students in their study choice decisions on the basis of a scientifically grounded theory. The test does not claim to serve as a sole decision-making instrument—rather, it is intended as a supplementary orientation tool that can provide a sound basis for further reflection on individual interests and study options. Other relevant aspects of the study choice process remain unaffected by this approach.

Test structure and item generation

The test consists of two modules (Module 1: vocational interests and Module 2: study-related interests) with 30 and 28 items, respectively. Based on the RIASEC profile identified in Module 1 and a subsequent adjustment using the study-related interests assessed in Module 2, the test generates a study recommendation in the form of a ranking covering a total of 143 different fields of study.

Module 1: Vocational Interests

The item generation for the first module was theory-driven and based on Holland's RIASEC model. The aim was to assess vocational interests through concrete descriptions of activities that represent typical academic work environments and tasks associated with the six interest dimensions: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional.

In the development of questionnaires for psychological constructs, an important methodological decision concerns the response format used to collect participants' answers (Wetzel et al., 2020). In both research and practice, different methodological approaches have become established. In addition to the commonly used rating scales (Brown & Maydeu-Olivares, 2011), forced-choice formats have attracted increasing attention in recent years (Lee et al., 2025).

In forced-choice formats, respondents are presented with two or more items simultaneously and are asked to select or rank them according to how well they describe them, with each item typically representing a different psychological trait (Lee et al., 2025; Wetzel et al., 2020).

The items in the first module follow a situational forced-choice design, as already used in interest assessment within the RIASEC context (e.g., Stangl, 2025a, 2025b).

The methodological principle described by Stangl (2000), which involves the paired comparison of activities within situational contexts, served as the conceptual framework for the construction of the first test module. This module assesses vocational interests and assigns them to the RIASEC dimensions. However, the test construction followed an independent design beyond this foundational approach.

To ensure broad content coverage, different activity facets and various work environments were considered for each dimension.

The items describe occupational work environments, while the corresponding response options, from which one must be selected, represent specific occupational activities that can be performed within those environments. The response options were designed to be balanced in terms of length, linguistic complexity, value neutrality, and attractiveness.

Particular attention was paid to describing work environments and activity alternatives that align with the future qualifications of prospective students.

The construction of the forced-choice items followed a systematic design in which each RIASEC dimension was paired with every other dimension exactly twice, resulting in a total of 30 items.

Each of the 30 forced-choice items presents two activities, each assigned to a specific RIASEC dimension. One point is awarded for the selected dimension, and points are summed across all items, resulting in a score ranging from 0 to a maximum of 10 points for each RIASEC dimension. Together, these scores define the participants' RIASEC profile.

The responses capture relative preferences between two alternatives and do not allow for an absolute evaluation of individual activities. By omitting neutral or graded response options, a clear decision structure was imposed, reducing midpoint responses.

An example of an item that contrasts the two RIASEC dimensions A and C is as follows:

"Which of the two activities suits you better?

In a publishing house…

a) polishing texts for language and style (note: loads on RIASEC A)

b) checking texts for spelling and formatting (note*:* loads on RIASEC C)"

Module 2: Study-Field-Related Interests

The second module consists of an interest test that presents study-field-specific and cross-disciplinary course content as it is taught in practice at higher education institutions. For each of the 28 items, participants are asked to rate how interested they are in the respective topic area. An example of an item that assesses interest in the field of technology in the present case is as follows:

"Are you interested in this topic area?

Machines and production facilities,

Materials,

Vehicle development,

Electrical systems,

Building construction.”

Interest was assessed using a four-point ordinal rating scale with the response options “yes,” “rather yes,” “rather no,” and “no.”

The substantive relevance of each topic block from Module 2 is evaluated for each of the 143 fields of study. In contrast to Module 1, which focuses on assessing vocational interests, this module allows participants to express their interest in or aversion to specific study-field-related course content, ensuring that these preferences are also taken into account in the test results.

By omitting a neutral midpoint category, this module likewise encourages a clear positioning by the participants.

Across the 28 items, each of which presents a set of five study-related course contents assigned to one or more fields of study, the response options “yes,” “rather yes,” “rather no,” and “no” are scored with 5, 3, 2, and 0 points, respectively. For each field of study, the assigned items are weighted in a study-field-specific manner (0–100%) and aggregated. The nonlinear scoring ensures that strong interest or strong disinterest in the items is disproportionately reflected in the test results.

Demographic Data:

After completing Modules 1 and 2, participants are asked to provide demographic information, specifically age and gender. In addition, respondents are asked whether they completed the test seriously.

Evaluation of Test Results

The calculation of the test results is carried out in two steps. First, the basic interest profile is determined based on the first module (RIASEC). This profile is then slightly adjusted using the second module, which captures topic-specific preferences and aversions.

Since the RIASEC model plays a central role as the structuring element of the test results, the following section focuses on this model.

When constructing cross-disciplinary study orientation tests, a major challenge is to adequately capture the heterogeneity of requirements both across different fields of study and within individual fields (Hell et al., 2009, author´s translation). One approach to addressing this challenge is to avoid assigning homogeneous profiles to study programs and instead allow for multiple appropriate profiles per field of study, thereby considering a broader range of relevant occupational fields in the evaluation of results (Hell et al., 2009).

In the Studyamo Test, multiple relevant RIASEC occupational profiles can be assigned to individual fields of study.

To assess person-environment fit, the measure of congruence is used (Grüneberg, 2022), as describing the fit between individuals and their environments (Hatzglos, 2009).

The assessment of congruence depends on the availability of RIASEC profiles for both individuals and environments. Consequently, occupations mentioned by respondents must be matched with corresponding RIASEC profiles (Hartmann et al., 2021).

In the interpretation of test results, attention is usually directed toward the one to three RIASEC codes with the highest scores, referred to as high-point codes, which describe a person or an environment (Tracey & Rounds, 1992).

These high-point codes are used to examine relationships within personality types and work environments, referred to as consistency, as well as to assess the relationship between personality types and work environments, referred to as congruence (Holland, 1997).

Based on the circumplex structure, an IR-type individual is considered more congruent with an AS-environment than with an SE environment (Tracey & Rounds, 1992).

In most cases, personal and environmental profiles are expressed using three-letter Holland codes representing the three dominant interest types (Hatzglos, 2009; Pahl & Tschiesner, 2023).

If not only the high-point codes but all six RIASEC dimensions are included, the resulting interest profile yields 6! (720) possible interest codes (Hatzglos, 2009). By contrast, three-letter high-point codes yield only 120 different RIASEC codes (6! divided by 3!).

Although congruence indices based on high-point codes have certain shortcomings, researchers cannot always rely on full RIASEC score profiles, for instance when only environmental high-point codes are available (Hartmann et al., 2021).

As shown by Jehli-Kamm (2011), different approaches can be used to determine congruence, typically resulting in a numerical indicator of the degree of congruence.

Based on a review of the criterion validity of different congruence measures, Xu and Li (2020, as cited in Hartmann et al., 2021) recommend the profile-based approach, which requires six personal and six environmental RIASEC scores.

An examination of the appropriate high-point codes for the 143 fields of study included in the test, which are generally publicly available on the websites of educational providers, showed that fields of study do not always have a single clearly defined RIASEC code, but rather that:

- These codes may differ in the number of RIASEC dimensions specified. (High-point codes with two letters, for example RI, and high-point codes with three letters, for example RIA, are used by different educational providers to code fields of study).
- These codes may also differ in their substantive use of RIASEC dimensions. In some cases, different educational providers assign different codes to substantively identical fields of study, even when the same number of RIASEC dimensions is used. This observation is consistent with previous research suggesting that more than one high-point code may characterize a given environment (e.g., Kim & Park, 2016).
- The codes provided by educational providers do not always reflect the profile strength of the respective environment, meaning that the sequence of RIASEC letters is not necessarily rank-ordered. Dimensions are often listed alphabetically, for example AIR, or in other unordered combinations, even when these listings deviate from typical rank-ordered profile patterns.

To reflect the available data on the education market as accurately as possible, all high-point codes assigned by educational providers were taken into account when defining the high-point codes for each individual field of study included in the Studyamo Test.

In addition, all RIASEC dimensions included in these high-point codes (R, I, A, S, E, and C) were converted into a frequency profile.

Both the high-point codes and the frequency profiles of the RIASEC dimensions derived in this way are incorporated into the result scoring with different weightings.

To determine the test result, all 143 fields of study are ranked according to their calculated congruence with the participants' respective RIASEC interest profiles. This ranking is slightly adjusted based on study-related interests. The detailed design of the independently developed calculation procedure used to determine the ranking is not disclosed in the present work. The psychometric evaluation of the study refers exclusively to the RIASEC module of the test, which provides the structural framework.

Test development process

As part of the test development process, a total of ten intermediate versions of the test were created and iteratively optimized over the period from October 2024 to November 2025.

Participation was voluntary in each case and took place as part of an online survey, without incentives and without the collection of personal data. The terms and conditions and data protection provisions were made available and had to be accepted.

To examine the content structure, exploratory and theory-driven factor analyses as well as multidimensional scaling (MDS) were used in early stages of development. The extent to which the RIASEC dimensions exhibited a circumplex pattern was examined. Deviations in the spatial pattern led to revisions of the item wording.

In addition, the distribution of responses was analyzed to identify items with skewed response patterns. Such items were revised or replaced with alternative items.

When evaluating response distributions, gender-specific differences in item responses were taken into account, as repeatedly reported in reference studies on interest measurement (e.g., Su et al., 2009).

This iterative process was continued until a stable and theoretically consistent structure was achieved in the final version of the test.

Methodology

The methodology described in this chapter refers exclusively to the final version of Module 1 (RIASEC) of the developed instrument.

Random sample

Data for the final test were collected online using a self-selected sample of N = 1,040 participants. The majority of participants were female (73 percent), followed by male participants (23 percent). One percent identified as nonbinary, and 3 percent did not report their gender. The age distribution was as follows: 7 percent were younger than 15 years, 51 percent were between 15 and 18 years, 30 percent were between 19 and 22 years, 5 percent were between 23 and 26 years, 1 percent were between 27 and 30 years, and 6 percent were older than 30 years. Most participants were from Germany (66 percent), followed by Austria (24 percent), the United States (8 percent), and Switzerland (2 percent).

Study design and data collection

The study was designed as a one-time, anonymized online cross-sectional investigation with the aim of conducting a psychometric evaluation of the final version of the test. Participation was voluntary, unpaid, and possible without any specific eligibility requirements. Data for the final test version were collected online between November 13–17, 2025, using a test embedded on https://www.studyamo.com.

Participants accessed the online study via a public link that was distributed through various digital channels during the data collection period. These channels included, in particular, advertising banners on education-related websites and Google Ads, both of which drew attention to the test. Access to the test was open to all interested individuals.

No IP addresses, names, or other personal data were collected or stored. Consent to participate was obtained at the outset by accepting the terms and conditions, which included a reference to the applicable data protection provisions.

Data Collection Instrument, Measurement Procedures, and Scales

The data collection instrument used was a forced-choice questionnaire that measured the six interest dimensions of Holland's RIASEC model Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C) using 30 items. Each item described a work environment and presented two alternative activities to choose from. Participants were required to select one of the two activity options based on their preference. Each of the two response options represented a RIASEC dimension, and across all item pairs, each RIASEC dimension was contrasted with every other RIASEC dimension exactly twice.

For each RIASEC dimension, a scale score was calculated by aggregating the number of selected responses across all items. Higher scores indicated a stronger preference for activities associated with a given RIASEC dimension, and lower scores indicated the opposite.

The scale scores were directly comparable within individuals. However, due to the forced-choice format, comparability between different individuals was limited.

Examination procedure

After accessing the link, participants were first required to confirm a terms and conditions checkbox. They then received a brief instruction for the test. Next, they completed the 30 forced-choice items in random order, followed by Module 2 and finally the entry of demographic information. The average completion time was approximately 9 minutes.

Psychometric Analyses

As part of the psychometric analysis, item characteristics, reliability, and structural reliability were examined.

Item analysis

The item analysis included an evaluation of response frequencies for each item pair in order to assess the functioning of the contrasted activity descriptions. This involved examining whether both response options were selected to an adequate extent and whether any systematic response tendencies were present. In addition, the distributions of responses within the six RIASEC dimensions were examined to ensure that all scales exhibited sufficient variability.

Reliability

The internal reliability of the instrument was examined. For this purpose, the test was split into two halves, and for each participant the frequencies of the selected RIASEC dimensions were calculated separately for each test half. Pearson correlations between the corresponding scale scores of the two test halves served as the basis for the reliability estimates, which were then extrapolated to the full test using the Spearman–Brown prophecy formula.

Structural validity

Structural validity was examined using multidimensional scaling (MDS), exploratory and theory-driven factor analysis, circumplex testing, and an analysis of the intercorrelation structure.

Multidimensional scaling (MDS). Multidimensional scaling was used to examine whether the resulting spatial configuration of the RIASEC dimensions was consistent with the assumptions of the theoretical model.

MDS was conducted based on the 6 × 6 correlation matrix of the aggregated RIASEC scales. To represent the relative similarities between the dimensions, the correlation matrix was first transformed into a distance matrix using Euclidean correlation distance. A classical MDS solution according to the Torgerson–Gower method was then computed without a random starting value. The visual arrangement of the RIASEC dimensions was examined to determine whether it corresponded to the assumptions of the model.

Exploratory factor analysis. Exploratory factor analysis was used to examine both the correspondence between the resulting factor structure of the RIASEC dimensions and the theoretical model assumptions, as well as the total variance explained by the extracted factors. The exploratory factor analysis (EFA) using principal axis factoring was based on the 6 × 6 correlation matrix of the aggregated RIASEC scales. Two factors were extracted via eigenvalue decomposition and subsequently rotated using Varimax rotation.

Theory-driven factor analysis. The theory-driven factor analysis was based on the 6 × 6 correlation matrix of the aggregated RIASEC scales and on a priori defined factor axes, thereby eliminating the need for eigenvalue extraction and rotation. The factorial structure resulted from projecting the standardized type scores onto the theoretically defined axes. In addition, the proportion of variance explained by this structure was calculated and compared with the variance explained in the exploratory factor analysis.

Circumplex testing. To assess model fit, the fit of the MDS solution was evaluated using Procrustes analysis. In this procedure, the empirically derived MDS coordinates were aligned with the ideal-typical hexagonal RIASEC configuration in order to determine the degree of correspondence between the spatial structures.

Intercorrelation structure. To analyze the intercorrelation structure, the relationships between the six RIASEC scales were examined using the 6 × 6 correlation matrix. It was assessed whether the pattern typical of a circumplex interest model emerged, in which adjacent dimensions show higher positive correlations and correlations decrease as the distance within the hexagon increases. Opposing dimensions were expected to exhibit low or negative associations.

External Validity

The external validity of the instrument was not examined in this study, as the focus was on the development and structural evaluation of the test. Further validation using external criteria would be the subject of future research.

Results

Item Analysis

The analysis of response frequencies shows that, for all 30 items, both response options were selected to an adequate extent. The distributions for each item were within a balanced range. The skewness indices reported in Table 2 ranged from 1.02 to 2.02, indicating only moderate preference differences, while entropy values were consistently high (≥ 0.91). No indications of problematic response biases, such as a systematic preference for specific response options, were found.

Table 2

Item skewness – key figures

Item	R	I	A	S	E	C	Total	Ratio_max_min	Entropy
1	0	0	568	0	0	472	1,040	1.20	0.99
2	0	0	696	0	344	0	1,040	2.02	0.92
3	0	475	565	0	0	0	1,040	1.19	1.00
4	383	0	657	0	0	0	1,040	1.72	0.95
5	0	0	504	536	0	0	1,040	1.06	1.00
6	0	0	620	0	0	420	1,040	1.48	0.97
7	0	0	0	0	541	499	1,040	1.08	1.00
8	0	549	0	0	0	491	1,040	1.12	1.00
9	400	0	0	0	0	640	1,040	1.60	0.96
10	0	0	0	584	0	456	1,040	1.28	0.99
11	0	0	586	0	454	0	1,040	1.29	0.99
12	0	0	0	0	546	494	1,040	1.11	1.00
13	0	540	0	0	500	0	1,040	1.08	1.00
14	450	0	0	0	590	0	1,040	1.31	0.99
15	0	0	0	569	471	0	1,040	1.21	0.99
16	0	505	535	0	0	0	1,040	1.06	1.00
17	0	591	0	0	0	449	1,040	1.32	0.99
18	0	531	0	0	509	0	1,040	1.04	1.00
19	356	684	0	0	0	0	1,040	1.92	0.93
20	0	532	0	508	0	0	1,040	1.05	1.00
21	515	0	525	0	0	0	1,040	1.02	1.00
22	564	0	0	0	0	476	1,040	1.19	1.00
23	474	0	0	0	566	0	1,040	1.19	0.99
24	444	596	0	0	0	0	1,040	1.34	0.99
25	339	0	0	701	0	0	1,040	2.07	0.91
26	0	0	582	458	0	0	1,040	1.27	0.99
27	0	0	0	590	0	450	1,040	1.31	0.99
28	0	0	0	559	481	0	1,040	1.16	1.00
29	0	526	0	514	0	0	1,040	1.02	1.00
30	494	0	0	546	0	0	1,040	1.11	1.00

Note. R, I, A, S, E, and C denote the six RIASEC dimensions. Ratio_max_min indicates response skewness; Entropy reflects distributional balance.

The examination of response distributions within the six RIASEC dimensions also confirmed the proper functioning of the items. The total frequencies per RIASEC dimension shown in Table 3, ranging from 4,419 to 5,838 responses, indicated a broad dispersion of preferences within the sample. Accordingly, all scales exhibited sufficient variability and met the requirements for subsequent psychometric analyses.

Table 3

Total Frequencies per RIASEC Dimension

RIASEC	Total Responses
R	4,419
I	5,529
A	5,838
S	5,565
E	5,002
C	4,847

Reliability

To examine the stability of the reliability estimates, three different balanced split-half configurations were created. In the forced-choice version, two items were available for each of the 15 RIASEC pairs (e.g., A–C, R–S, I–E). For a balanced split, exactly one item from each pair was assigned to test half A (Set 1) and the other item to test half B (Set 2). This ensured that each pair was represented exactly once in each half for every split.

The three splits included one “canonical” split, in which the first item of each pair was assigned to test half A and the second to test half B, as well as two independently generated random but fully balanced assignments, in which one item from each pair was assigned to each half.

For each split, scale scores per half were calculated as the frequencies of the selected RIASEC dimensions. The split-half coefficients were computed as Pearson correlations between the two halves (r(A,B)). The assignment of items to splits is shown in Table 4. The reliability of the full 30-item test was then corrected using the Spearman–Brown formula. In addition, the mean of the three Spearman–Brown coefficients was reported for each scale as a robust estimate of reliability.

Table 4

Item Composition of Splits 1–3

Split1 Set1	Split1 Set2	Split2 Set1	Split2 Set2	Split3 Set1	Split3 Set2
1 (AC)	6 (AC)	1 (AC)	2 (AE)	3 (AI)	1 (AC)
2 (AE)	11 (AE)	4 (AR)	3 (AI)	5 (AS)	2 (AE)
3 (AI)	12 (CE)	5 (AS)	6 (AC)	6 (AC)	4 (AR)
4 (AR)	16 (AI)	8 (CI)	7 (CE)	8 (CI)	7 (CE)
5 (AS)	17 (CI)	10 (CS)	9 (CR)	9 (CR)	10 (CS)
7 (CE)	18 (EI)	11 (AE)	14 (ER)	11 (AE)	13 (EI)
8 (CI)	21 (AR)	12 (CE)	15 (ES)	12 (CE)	14 (ER)
9 (CR)	22 (CR)	13 (EI)	17 (CI)	15 (ES)	16 (AI)
10 (CS)	23 (ER)	16 (AI)	18 (EI)	18 (EI)	17 (CI)
13 (EI)	24 (IR)	22 (CR)	19 (IR)	21 (AR)	19 (IR)
14 (ER)	26 (AS)	23 (ER)	20 (IS)	23 (ER)	20 (IS)
15 (ES)	27 (CS)	24 (IR)	21 (AR)	24 (IR)	22 (CR)
19 (IR)	28 (ES)	28 (ES)	25 (RS)	25 (RS)	26 (AS)
20 (IS)	29 (IS)	29 (IS)	26 (AS)	27 (CS)	28 (ES)
25 (RS)	30 (RS)	30 (RS)	27 (CS)	29 (IS)	30 (RS)

Note. The table shows the three balanced split-half configurations; in each split, every RIASEC pair appears exactly once per half. Item numbers are followed by the corresponding RIASEC pair in parentheses.

Across all three splits, consistent moderate to good reliability coefficients were obtained for all six RIASEC scales, with Spearman–Brown coefficients typically ranging between .58 and .73. The values reported in Table 5 differed only slightly across the three split variants, indicating that the reliability estimates were robust with respect to the specific allocation of paired items.

Table 5

Reliability Overview

Scale	r1	SB1	r2	SB2	r3	SB3	SB_mean
R	0.55	0.71	0.57	0.73	0.48	0.65	0.70
I	0.46	0.63	0.49	0.66	0.49	0.66	0.65
A	0.42	0.59	0.40	0.57	0.41	0.59	0.58
S	0.52	0.68	0.65	0.79	0.57	0.73	0.73
E	0.51	0.68	0.52	0.68	0.50	0.67	0.68
C	0.54	0.70	0.56	0.72	0.57	0.72	0.71

Note. The table reports split-half correlations (r) and Spearman–Brown–corrected reliabilities (SB) for three balanced split configurations, along with the mean Spearman–Brown coefficient (SB_mean) as the overall reliability estimate.

The relatively high coefficients were in line with expectations, as fully balanced split-half designs optimally capture measurement precision in forced-choice data. Overall, the results indicate that the test measured the six RIASEC dimensions in a stable manner and with good internal consistency.

Structural Validity

Multidimensional Scaling (MDS)

Based on the 6 × 6 correlation matrix of the aggregated RIASEC scales shown in Table 6 (N = 1,040), a classical multidimensional scaling analysis according to Torgerson–Gower was conducted. Correlations between the scales ranged from r = −.41 (Realistic–Social) to r = .04 (Realistic–Investigative; Realistic–Conventional). To compute distances, the correlation matrix was transformed into a Euclidean correlation distance matrix (Table 7).

Table 6

Pearson Correlation for RIASEC Scales (N=1040)

Variable	R	I	A	S	E	C
R	—					
I	0.04	—				
A	-0.27	-0.22	—			
S	-0.41	-0.37	0	—		
E	-0.37	-0.23	-0.16	-0.01	—	
C	0.04	-0.13	-0.32	-0.36	-0.23	—

Note. Pearson correlations are reported. Diagonal elements are not shown

Table 7

Distance Matrix (Euclidean Correlation Distance)

Variable	R	I	A	S	E	C
R	—					
I	1.38	—				
A	1.59	1.56	—			
S	1.68	1.66	1.42	—		
E	1.66	1.57	1.52	1.42	—	
C	1.38	1.51	1.63	1.65	1.57	—

Note. Distances computed as d_ij = sqrt(2(1 - r_ij)) based on the 6×6 correlation matrix (N = 1040). Diagonal elements are not shown

The resulting 6 × 6 distance matrix served as the basis for the classical MDS. Eigenvalue decomposition of the double-centered distance matrix yielded five positive eigenvalues, which together accounted for 100 percent of the variance. The first two dimensions explained 51.8 percent of the total variance (see Table 8). The resulting two-dimensional configuration of the six RIASEC dimensions is shown in Figure 3. The coordinates of the types in this two-dimensional space are reported in Table 9.

Table 8

Eigenvalues and Variance Explained

Dimension	Eigenvalue	Proportion of Variance	Cumulative Variance Explained
Dimension 1	1.895	0.316	0.316
Dimension 2	1.213	0.202	0.518
Dimension 3	1.110	0.185	0.704
Dimension 4	0.930	0.155	0.859
Dimension 5	0.847	0.141	1.000
Dimension 6	0.000	0.000	1.000

Note. Eigenvalues obtained from classical MDS (Torgerson–Gower) of the distance matrix.

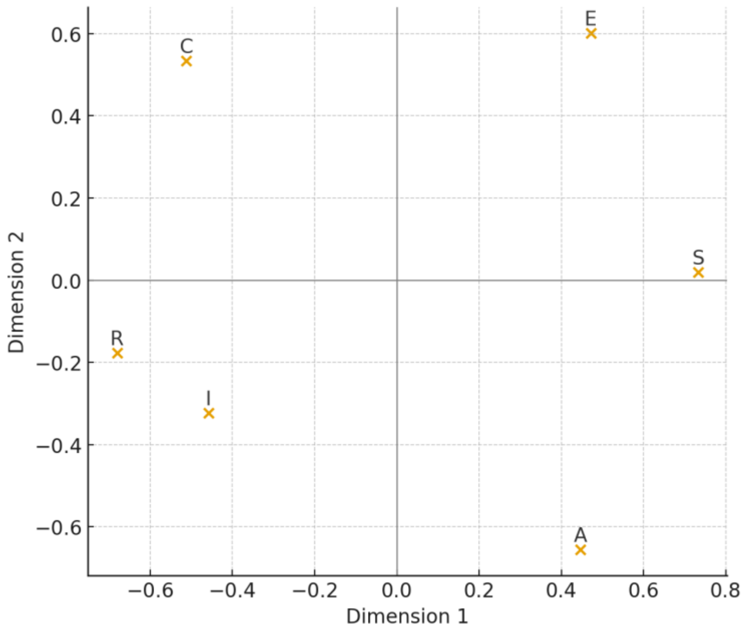
Table 9

Two-Dimensional MDS Coordinates (RIASEC)

RIASEC-Dimension	Dimension 1	Dimension 2
R	-0.68	-0.18
I	-0.46	-0.32
A	0.45	-0.66
S	0.73	0.02
E	0.47	0.60
C	-0.51	0.53

Figure 3

Two-Dimensional MDS Configuration of the RIASEC Scales



Model fit was evaluated using Kruskal's Stress-1 index, which is calculated based on the discrepancies between the original and reconstructed distances. For the present two-dimensional solution, a Stress-1 value of 0.36 was obtained, indicating a moderate fit, as expected when representing a complex distance structure in two dimensions.

Overall, the resulting configuration showed an approximately circular or hexagonal structure of the RIASEC dimensions, consistent with Holland's theoretical model.

Exploratory Factor Analysis

To identify the structure of the RIASEC dimensions, an exploratory factor analysis was conducted based on the 6 × 6 correlation matrix of the aggregated RIASEC scales (see Table 6). Varimax rotation of the two-factor solution yielded a clearly interpretable loading pattern. On the first factor, Realistic (R) and Investigative (I) showed pronounced negative loadings, whereas Social (S) and Enterprising (E) exhibited high positive loadings. The second factor was primarily defined by a high negative loading of Artistic (A) and a high positive loading of Conventional (C). The factor loadings are presented in Table 10.

Table 10

Varimax-Rotated Factor Loadings of the Exploratory Factor Analysis

RIASEC-Dimension	Factor 1	Factor 2
R	-0.672	0.255
I	-0.580	0.003
A	-0.035	-0.792
S	0.595	-0.406
E	0.714	0.214
C	-0.121	0.736

Factor 1 explained 27.8 percent and Factor 2 explained 24.1 percent of the total variance. Together, the two factors accounted for 51.8 percent of the variance. All values are reported in Table 11.

Table 11

Variance Explained by the Varimax-Rotated Exploratory Factor Analysis

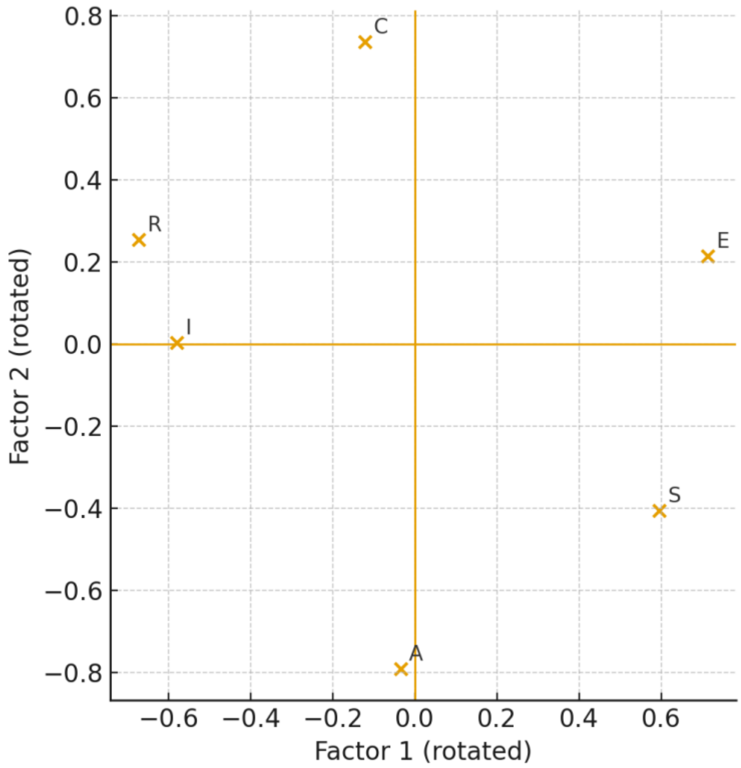
Factor	SS loadings	PropVar	CumPropVar
F1	1.666	0.278	0.278
F2	1.443	0.241	0.518

Note. SS loadings = sum of squared rotated loadings; PropVar = proportion of total variance; CumPropVar = cumulative proportion.

Overall, the rotated solution shown in Figure 4 exhibited a clearly structured and substantively well-interpretable factor configuration.

Figure 4

Two-Dimensional Representation of the Exploratory Factor Loadings



Theory-Driven Factor Analysis

For the theory-driven analysis of the structure of the six RIASEC dimensions, the correlation matrix of the aggregated RIASEC scales was first computed (see Table 6). Subsequently, two fixed target vectors were specified to represent conceptually central axes of differentiation. The first factor distinguished Social (S), Artistic (A), and Enterprising (E) from Realistic (R), Investigative (I), and Conventional (C), while the second factor separated Enterprising (E) and Conventional (C) from Artistic (A) and Investigative (I), leaving Realistic (R) and Social (S) neutral. The six RIASEC dimensions were then projected onto these two predefined factors and normalized so that the resulting coordinates corresponded to the properties of classical factor loadings (see Table 12).

Table 12

Factor Loadings of the Theory-Driven Factor Analysis

RIASEC-Dimension	Factor 1	Factor 2
R	-0.640	-0.048
I	-0.517	-0.521
A	0.495	-0.577
S	0.639	0.000
E	0.497	0.527
C	-0.547	0.562

The variance explained by the two theory-driven factors was determined using the Rayleigh quotient. Factor 1 accounted for 30.9 percent and Factor 2 for an additional 19.9 percent, resulting in a combined explanation of 50.8 percent of the total variance (see Table 13). The two-dimensional representation of the six types in the theory-driven factor space illustrated the expected grouping in accordance with the defined axes (see Figure 5). The theory-driven factor analysis explained nearly the same proportion of total variance as the exploratory factor analysis, with 50.8 percent compared to 51.8 percent.

Table 13

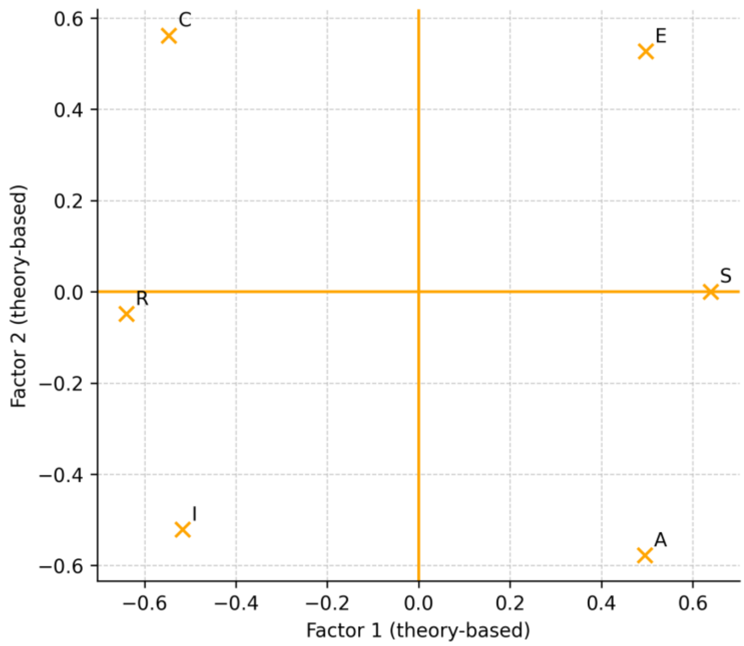
Variance Explained by the Theory-Driven Factor Analysis (Rayleigh)

Factor	Eigenvalue (Rayleigh)	Proportion of Variance	Cumulative Proportion
Factor 1	1.853	0.309	0.309
Factor 2	1.196	0.199	0.508

Note. Eigenvalues are Rayleigh quotients; PropVar = proportion of total variance

Figure 5

Two-Dimensional Representation of the Theory-Driven Factor Analysis



Circumplex Testing

To evaluate the structural validity of the MDS solution, a Procrustes analysis was conducted in which the empirical two-dimensional RIASEC coordinates were aligned with an ideal-typical regular hexagon (R–I–A–S–E–C; angles 0°, 60°, 120°, 180°, 240°, 300°) (see Figure 6). A comparison of the ideal, empirical, and transformed RIASEC coordinates is presented in Table 14. The Procrustes fit was calculated by optimally aligning the empirical MDS coordinates to the ideal-typical hexagonal RIASEC configuration using an orthogonal Procrustes transformation (rotation, translation, and scaling). The analysis yielded a Procrustes fit of $R^2 = 0.94$, indicating a high level of correspondence between the empirical configuration and Holland's theoretical structure.

Figure 6

Procrustes Alignment Between Ideal and Empirical MDS Configurations

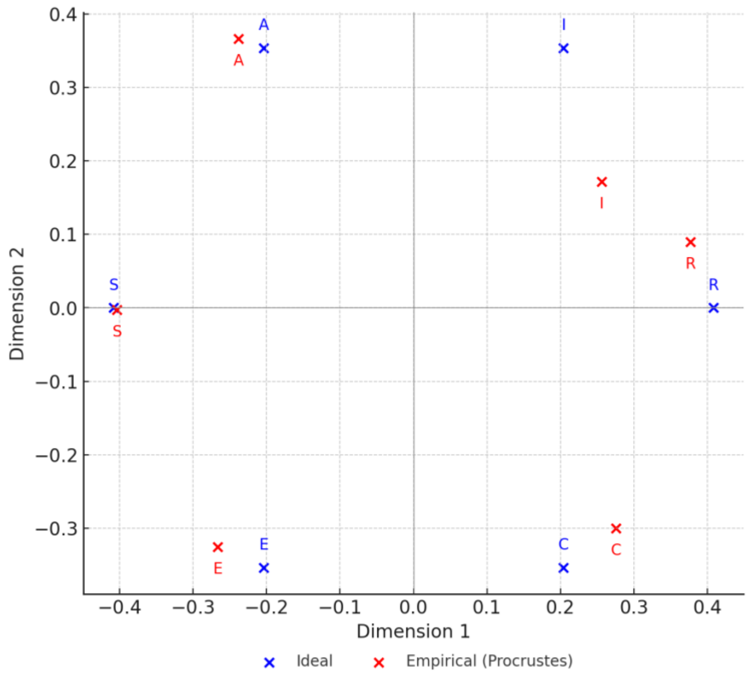


Table 14

Comparison of Ideal, Empirical, and Procrustes-Transformed RIASEC Coordinates

RIASEC Type	Ideal X	Ideal Y	Empirical X	Empirical Y	Aligned X	Aligned Y
R	1.00	0.00	-0.68	-0.18	0.38	0.09
I	0.50	0.87	-0.46	-0.32	0.26	0.17
A	-0.50	0.87	0.45	-0.66	-0.24	0.37
S	-1.00	0.00	0.73	0.02	-0.40	0.00
E	-0.50	-0.87	0.47	0.60	-0.27	-0.33
C	0.50	-0.87	-0.51	0.53	0.28	-0.30

Note. Ideal coordinates represent a regular hexagon on the unit circle (R–I–A–S–E–C order). Aligned coordinates reflect the Procrustes-transformed empirical MDS configuration.

As an additional assessment of structural similarity, the correlation between the distance matrices was also calculated. For each of the two configurations (ideal vs. empirical, shown in Table 15), pairwise Euclidean distances were computed and a Pearson correlation was then calculated across the distance pairs above the main diagonal. This index described the extent to which the relative distance relationships among the RIASEC dimensions in the empirical MDS space corresponded to the ideal-typical hexagonal structure. The Pearson correlation between the pairwise distances of the empirical and ideal configurations was r = .83.

Both indices confirmed a very good fit of the empirical MDS solution to the proposed hexagonal RIASEC structure.

Table 15

Pairwise Distances in the Ideal and Empirical RIASEC Hexagon

RIASEC Pair	Ideal Distance	Empirical Distance
R–I	1.00	0.27
R–A	1.73	1.23
R–S	2.00	1.43
R–E	1.73	1.39
R–C	1.00	0.73
I–A	1.00	0.96
I–S	1.73	1.24
I–E	2.00	1.31
I–C	1.73	0.86
A–S	1.00	0.73
A–E	1.73	1.26
A–C	2.00	1.53
S–E	1.00	0.64
S–C	1.73	1.35
E–C	1.00	0.99

Note. Distances are Euclidean distances in the two-dimensional space.

Intercorrelation Structure

To analyze the intercorrelation structure, the 6 × 6 correlation matrix of the aggregated RIASEC scales was computed. Taking into account the ipsative nature of the data, in which values around zero indicate greater similarity and increasingly negative correlations indicate greater dissimilarity, an overall pattern emerged that was consistent with the structure of the RIASEC model. Adjacent dimensions generally showed correlations close to zero, scale pairs along the short diagonal exhibited moderately negative associations, and opposing dimensions displayed the strongest negative correlations. Thus, the rank order of the empirical relationships largely corresponded to theoretical expectations. However, some pairs deviated from this pattern, indicating that while the hexagonal structure was discernible in the data, it was not uniformly pronounced across all dimensions (see Table 16).

Table 16

Observed Correlations Among RIASEC Dimensions by Hexagon Distance

RIASEC Pair	Hexagon Relation	Observed Correlation (r)
R–I	Adjacent	0.04
R–A	Short diagonal	-0.27
R–S	Long diagonal	-0.41
R–E	Short diagonal	-0.37
R–C	Adjacent	0.04
I–A	Adjacent	-0.22
I–S	Short diagonal	-0.37
I–E	Long diagonal	-0.23
I–C	Short diagonal	-0.13
A–S	Adjacent	0.00
A–E	Short diagonal	-0.16
A–C	Long diagonal	-0.33
S–E	Adjacent	-0.01
S–C	Short diagonal	-0.36
E–C	Adjacent	-0.23

Discussion

The present study examined the psychometric properties of a newly developed RIASEC interest inventory. Across multiple analytical approaches, the results indicate a largely consistent structural representation of the RIASEC model as well as overall satisfactory measurement properties of the instrument.

Item Characteristics

The item analyses revealed no indications of systematic response tendencies, suggesting appropriate item wording and instructions. Accordingly, the item pool meets key prerequisites for the valid assessment of vocational interests across the six RIASEC dimensions.

Internal Consistency

The estimates of internal consistency were in the moderate to good range. Given the relatively small number of items per dimension, these values can be considered satisfactory.

Structural Validity

Structural validity was examined using multidimensional scaling, exploratory factor analysis, and theory-driven factor analysis. All methods yielded largely convergent structural patterns. The MDS solution showed a clearly discernible, quasi-circumplex arrangement of the six RIASEC dimensions that largely corresponded to the theoretical assumptions of the model.

Both the exploratory and the theory-driven factor analyses corroborated this finding. In both analyses, the first two factors explained approximately half of the total variance (51.8 percent and 50.8 percent, respectively), and the resulting structures showed a high degree of correspondence with the MDS solution.

Further evidence for the circumplex structure emerged from the circumplex test using Procrustes rotation. The very high fit value of $R^2 = 0.94$ can be interpreted as strong support for the validity of the assumed circumplex arrangement of the RIASEC dimensions.

Deviations from the Ideal-Typical RIASEC Hexagon

Despite the overall high level of correspondence with the theoretical model, deviations from the ideal-typical RIASEC hexagon were observed. In particular, the Realistic and Investigative dimensions were positioned closer to one another than theoretically expected in both the MDS solution and the factor analyses. Such deviations are not uncommon in empirical applications of the RIASEC model and have also been reported in validation studies of established instruments.

Intercorrelation Structure

The intercorrelation structure of the six scales is overall consistent with the assumptions of the circumplex RIASEC model. Adjacent dimensions showed stronger associations than opposing dimensions, which is considered a central criterion for the validity of the model. However, some scale pairs deviated from this ideal-typical pattern. Such deviations have been repeatedly reported in RIASEC research. Given the clearly discernible overall circumplex structure, these deviations appear limited and are unlikely to substantially affect the overall interpretation of the results.

Limitations

Several limitations should be considered when interpreting the results. The sample consisted exclusively of participants from Austria, Germany, Switzerland, and the United States. The generalizability of the findings to other cultural contexts is therefore currently limited. Because vocational interests may be shaped by cultural factors, examining the structure in additional countries and cultural contexts is recommended.

Furthermore, the psychometric analyses refer exclusively to the structure-defining RIASEC module of the Studyamo Test. The test also includes a second module designed to assess field-of-study–specific interests. This module contributes with a low weighting to the overall score and is used to adjust the resulting study recommendations based on the identified RIASEC interest profile. The psychometric properties of this second module were not examined in the present study. Accordingly, the reported results relate solely to the structure-defining RIASEC module. Future studies should examine the validity of the field-of-study-specific interest module and its contribution to the overall interpretation of the test results separately.

In addition, the assessment of reliability was limited to estimates of internal consistency. Statements regarding the temporal stability of the scores are not possible in the absence of retest data.

Moreover, further content balancing of individual items appears advisable in order to further optimize scale differentiation.

Although the sample size was sufficient for the analyses conducted, larger and more heterogeneous samples would be desirable for future validation studies.

Outlook

The present study represents an initial validation step for the developed RIASEC test. The instrument will be systematically examined and further refined by its developer in future work. Planned steps include the collection of retest data, targeted item revisions, and the examination of additional validity criteria. In addition, the validity of the test will be investigated more extensively across different cultural contexts.

In summary, the results provide compelling evidence that the developed RIASEC inventory enables a psychometrically sound and theoretically coherent assessment of vocational interests and shows strong potential for further validation and applied research.

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