Construction and initial validation of the scale "Goals for Future Design of the 2030 Agenda"

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Abstract

Sustainable development goals are used as guidance for future career and life design. The importance of including young people in the sustainability process is recognized also by recent vocational guidance literature. Nevertheless, the assessment of the Sustainable Development Goals itself presents a challenge. For these reasons, we validated a specific assessment instrument to investigate adolescents' propensity to point out how much each of the 2030 Agenda goals for sustainable development may affect their future design. This article reports the development and psychometric requisites of the *Goals for Future Design of the 2030 Agenda."* The scale recalls the 17 Sustainable Development Goals. The study involved 554 high school students. Initial exploratory factor analysis factorial structure showed a four-factor structure of the 17-item scale: (1) social/health, (2) environment/nature, (3) human rights/equal economic development, and (4) policy and democracy. A single-factor second-order structure also emerged from the confirmatory factor analysis. The results support the use of the scale in vocational guidance and career counselling activities to promote adolescents' life design in a sustainable and inclusive way.

Keywords Sustainable development · Vocational guidance · Scale assessment

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Introduction

In the last few years, there has been an increased understanding that adolescents design their future careers in a context filled with several major crises that jeopardize the future of humankind (Cohen-Scali et al., 2018; Pouyaud & Guichard, 2017). The first central crisis involves both demographic and social justice. On the one hand, there is an increase in the world's population. On the other hand, there is increased exposure to higher poverty rates, and inequalities within and among countries, with enormous disparities in opportunity, wealth, and power (Cohen-Scali et al., 2018; Guichard, 2018). Moreover, the inequality in the distribution of goods increases from year to year (Piketty, 2014), at such a pace that today there is a minority that owns a constantly expanding wealth in every country. A large part of the remaining population, on the contrary, is experiencing difficulties, struggling to avoid falling into the spiral of poverty. This group of people is powerless when confronting the reduction of their well-being level.

The second central crisis is a result of the abovementioned situation and can be defined as "ecological." The consequence of the demographic weight, severe inequalities, and over-consumption by rich minorities is that humankind uses many more natural resources and generates more waste every year compared with what the planet can produce in the same lapse of time. This causes global warming, higher global pollution, and disasters such as extreme atmospheric phenomena and biodiversity loss. This translates into global risks regarding the "probability of occurrence" and their "impact." As underlined by Rifkin (2019), today, we find ourselves in the middle of what can be considered the sixth mass extinction of life on Earth. This is happening due to the lack of awareness of most of the population, more and more extreme climatic events that jeopardize life on planet Earth, and the disruption of the hydrosphere, an essential element for preserving life. This has also been underlined by the recent experience associated with the coronavirus disease 2019 (COVID-19) global pandemic. According to the virologist Capua (2020), director of One Health Center of Excellence at the University of Florida, it has to be connected to inadequate ecosystem management.

According to the International Labor Organization (2020), young adults constitute the pandemic's principal victims of social and economic consequences. There is a risk that they will be scarred throughout their working lives—leading to the emergence of a "lockdown generation." The COVID-19 crisis is expected to create more obstacles for young people in the job market: for young adults, the lack of jobs is likely to result in longer school-to-work transitions. Concerning the enormous pandemic disruption, there is a growing interest in vocational and career guidance, as reflected by a recent special issue (Fouad, 2020). Suggestions for research on this phenomenon and its impact on young people are investigated. In particular, Blustein et al. (2020) inspire scholars and practitioners to develop research, career interventions, and vocational educational instruments, providing tangible support, especially for young people, during this crisis. These studies may improve the process of collective empowerment and critical consciousness development.

These challenges have induced changes and transformations as regards the labor market demands. They have profound consequences and affect future career design processes, especially among younger people. For the latter, the uncertainty that characterizes the world of work and current times represents a source of discomfort and difficulty that leads many people to disengage, avoid building their future, and move on without aspirations and goals to achieve (Iovu et al., 2018; Kenny et al., 2019; Lewchuk, 2017). Moreover, as recently underlined by Chohan (2020), the global coronavirus pandemic (COVID-19) has highlighted unsustainable policies. On a global level, the economy of recent years has widespread inequalities, the privatization of public good, the precariousness of economic life, the use of the economy as a tool of violence, the brutal imposition of a police state in occupied areas, and regulations in favor of private interests. According to the author, the post-coronavirus age may represent a critical historical moment to reconsider politics, society, and the international economy. Specifically, there is the need to share values that involve protecting the public good from a local and global point of view, planning activities to reach long-term goals, and launching projects based on equity and sustainability.

All of this makes us carefully consider the global challenges for the future and the well-being of future generations, as also highlighted by the United Nations (2015), and the need to start operational paths to find their completion, as outlined in the 2030 Agenda and its Sustainable Development Goals (SDGs), which can be considered guidelines for a new evolution. The Agenda identifies 17 Sustainable Development Goals (SDGs) in an extensive action program with 169 targets. The official launch of the Sustainable Development Goals was in 2016; the countries taking part in this project plan to meet them by 2030. The 17 targets of sustainability are: (1) No Poverty; (2) Zero Hunger; (3) Good Health and Well-being; (4) Quality Education; (5) Gender Equality; (6) Clean Water and Sanitation; (7) Affordable and Clean Energy; (8) Decent Work and Economic Growth; (9) Industry, Innovation, and Infrastructure; (10) Reduced Inequalities; (11) Sustainable Cities and Communities; (12) Responsible Consumption and Production; (13) Climate Action; (14) Life Below Water; (15) Life on Land; (16) Peace, Justice, and Strong Institutions; and (17) Partnerships to achieve the goals.

Despite the importance of said goals, a report carried out by the Overseas Development Institute (ODI; Moyer et al., 2020) called "Projecting progress: Reaching the SDGs by 2030" states that not a single goal will be met by 2030 if current trends continue, and quantifies how much the world would need to accelerate current trends to achieve the SDGs by 2030. This analysis should not be interpreted as a predetermined outcome. Instead, it should serve as a wake-up call. If the SDGs represent "the future we want," a rapid acceleration in current progress is required to achieve these ambitious goals. Simply maintaining the status quo will not be enough. Radical change is required. Many of the SDGs would be within reach by 2030 if the world replicates the progress of some of the top-performing countries.

For these reasons, the abovementioned global challenges and the idea of goals for sustainable development associated with them have produced new challenges in the last few years and, consequently, added new targets to the mission of career counselling and career guidance (Blustein et al., 2020). As specified by Međugorac et al. (2019), guidance can be considered an essential element to reach Sustainable

Development Goals by supporting people in their future career design. As concerns creating a sustainable career future, many different contributions highlight the necessity to get people ready for personal and professional forms of life that grant sustainable global development. For example, Pouyaud and Guichard (2017) encourage the development of a good life with and for others and support the sustainability of human life on Earth.

Guichard (2018) suggested that this requires conceiving and implementing interventions and assessment instruments significantly different from those used today in career guidance activities. Furthermore, Masdonati et al. (2021) highlight the importance of proposing a new perception of the features and forms of a successful transition within the current socioeconomic context, highlighting the key role of contextual factors as predictors of the school-to-work transition outcomes. Finally, de Vos et al. (2018) underline the importance of supporting people to facilitate their access to decent and meaningful work and promote sustainable career development, illustrating the main contextual determinants (De Vos et al., 2018).

Considering all of this, in the present paper, we developed and validated a specific assessment scale to investigate adolescents' propensity to point out how much each one of the 17 goals of the 2030 Agenda may affect their future design while being aware that the number of goals regarding environmental and economic aspects is more consistent than the number of goal related to social and democratic sustainability. This study is a first attempt to analyze the construction and initial validation of a scale based on the 17 goals of the 2030 Agenda that can help research and practice activities to analyze the propensity to consider global challenges as contextual factors that could predict the school-to-work transition outcomes and reach sustainable development in one's educational and career design.

The idea of sustainable development

In 1987, the UN World Commission on Environment and Development published its report titled *Our Common Future* (Brundtland, et al. 1987), asking for a new era of economic growth that had to be forceful and, at the same time, socially and environmentally sustainable. Since that moment, there has been an increasing interest in the concept of sustainable development with the resulting intensification of scientific publications on this topic (Purvis et al., 2019), especially in the last few years. The concept of sustainable development concerns the economic and social development of humankind. It requires solidarity between wealthy and emerging countries and with future generations, asking for global environmental protection and insisting on seeing economic, social, and ecological factors as equal and interdependent for present and future generations (Kargulova, 2018).

The most general approach represents a division of sustainable development into three domains: economic, ecological, and social (Robinson & Tinker, 1998). In the sustainability framework by Vogelpohl and Aggestam (2012), institutions are the fourth dimension of sustainable development (democratic and political sustainability). In the model by Vogelpohl and Aggestam (2012), the central idea is that sustainable development is an integrative concept that involves fundamental aspects

such as environment/nature, society/health, human rights and equal economic development, institutions/policy, and democracy. These dimensions have been defined as the cornerstones of sustainable development, based on responsible behavior that requires special care for natural, human, economic, and political capital (Hansmann et al., 2012).

Environmental sustainability first considers the integrity of the terrestrial ecosystem and the quality of the environment, intended as a good that improves the quality of life and, consequently, leads to development.

Economic sustainability involves creating income and working for people's sustainment with a long-term view regarding sustainable and intergenerational equality. This is achieved through the rational and efficient use of resources and by decreasing the use of non-renewable ones (Rigamontiet al., 2016).

Social sustainability aims at an equal social distribution of benefits and costs in a world where men and women can manage the environment. This should be done on a global scale to diversify and integrate both the sociocultural and economic human resources to give value to heterogeneity and diversity, local identities, and biodiversity. This should be a non-hierarchical system to create participative organizational ones, with the ultimate goal of supporting equality, democracy, and the well-being of societies.

Democratic and political sustainability aims at developing a transformative, participative, cosmopolitan, and eco-centric agenda. The Agenda should be based on taking a step back from neoliberal policies, revising the existing institutions, integrating environmental values, and expanding participative governance (Pickering et al., 2020).

Career and life design for a sustainable future

In the field of career guidance, attention is increasingly focused on sustainable development. Many contributions underline the necessity to prepare people, particularly young people, for their future careers and personal and professional forms of living that could grant global sustainable development (Guichard, 2022; Pouyaud & Guichard, 2017).

During the last decade, the Life Design approach emphasized the attention focused on the social contexts people live in and on the idea that career development is to be intended as a dynamic interaction between the person and their environment. It also considers all the relevant roles of the individual and the social and global context for the construction of career stories and life projects (Nota & Rossier, 2015; Savickas et al., 2009). While the Life Design approach gave value to a certain level of individual agency and the role of context (Nota & Rossier, 2015), the recent recognition of global challenges is making people also consider topics concerning social justice and sustainability to promote and contribute to a fair and sustainable development (Authors, 2019a; Guichard, 2018). In this way, it becomes essential to encourage people to give meaning to their existences, considering the consequences of their own active lives on others (particularly as regards social justice and sustainable development; Guichard, 2018).

This means that the target of career activities must move from investigating one's features, passions, attitudes, and abilities to the possibility one has to support equal and sustainable development. It is crucial to promote career designs that are less "ego-centric" and directed to choosing positive actions for one's benefit and creating life contexts and conditions aimed at sustainable development. Moreover, special attention is focused on the knowledge, skills, and values needed to live and work sustainably in career guidance activities. This also involves integrating an educational and career path regarding the knowledge and abilities needed to conduct a sustainable career activity. Said activity may support adolescents to consider a future career that aims at environmental, social, economic, or political sustainability (Baumgartner, 2014; Dierdorf et al., 2013; Međugorac et al., 2019; Authors et al., in press).

Sustainable development and career design

Despite the growing attention given to sustainability in career guidance, only a few studies focused on the tendency that young people have to consider global challenges to attain sustainable development in their reflections about their future. This could also be linked to the lack of validated assessment instruments to investigate adolescents' propensity to consider global challenges and the idea of sustainable development in career guidance. In this regard, Di Maggio et al. (2020) found out that there are two factors that, through the role of personal and social hope, directly and indirectly positively affect the tendency adolescents have to invest in university education. Said factors are the tendency to consider the systemic challenges to attain sustainable development in education/career design and career adaptability, which is the psychological ability to cope with change and recover from circumstances that affect career plans. Furthermore, McIllveen et al. (2019) highlighted a positive relationship between career adaptability and sustainability, while Valickas et al. study (2019) emphasized the correlation between planned happenstance (specifically career-related optimism and flexibility) and sustainable development.

The attention to sustainable development can function as a foundation for researching new, complex, and innovative solutions to global challenges to guarantee a society able to provide well-being and satisfaction for everyone (Glasser, 2019). Međgorac et al. (2019), within the Social Cognitive Career Theory (SCCT) framework, verified that it is possible to consider the professional design of adolescents in line with the idea of sustainable development. They measured it with 12 items that assess participants' intentions to professionally engage in the field of sustainability. The authors highlight that focusing on these aspects may help the learning experiences in sustainable development and may also guarantee the unfolding of domain-specific self-efficacy in this field.

Research goal

Guichard (2018, 2022) suggests that more research in the field of guidance and career counselling should be carried out to support sustainable development, and to this end,

specific assessment instruments have to be validated to investigate the propensity adolescents have to consider global challenges and the idea of a sustainable development connected to future educational and work design. With this in mind, we created the *Goals for Future Design of the 2030 Agenda* (GFD). Said scale is mainly focused on global challenges and the dimensions of sustainable development, a topic that shares the interest of the 2030 Agenda and its 17 goals. The scale examines adolescents' tendency to point out how much each of the 17 goals can affect their future educational and professional design.

Two studies with two independent samples of adolescents were conducted. The first study was carried out to explore the constructs and then verify the instrument's psychometric requisites, such as reliability and the structure of the scale. As Nunnally and Bernstein ([1994](#)) suggested, we expected to achieve internal consistency indices of at least 0.70 since it is considered an acceptable reliability coefficient. The authors, in fact, state that alphas below 0.70 indicate poor reliability and imply poor predictive validity.

The second study examined the factorial structure's stability and the instrument's concurrent validity. Specifically, the hypothesized model (labeled H: 17-4-1) assumes that the 17 items can be clustered into four subscales (social/health, environment/nature, human rights/equal economic development, and policy and democracy) and that the four subscales represent a single factor—namely, the four first-level factors can be combined into a single second-order factor.

As regards concurrent validity, we hypothesized the existence of moderated correlation patterns between the tendency one has to consider the systemic challenges to attain sustainable development in their career design, the four dimensions of career adaptability (Savickas & Porfeli, [2012](#)), and planned happenstance (Kim et al., [2014](#); Krumboltz, [2009](#)). Specifically, we expected moderated correlations between the tendency one has to consider the systemic challenges to attain sustainable development in the future and optimism and flexibility in particular.

Method

Participants

The sample consisted of 554 high school students, 223 girls (40.3%) and 331 boys (59.7%), from 10 different high schools in the north of Italy. The *r* mean (*M*) age was 17.30 [standard deviation (SD) = 0.844], with a range of 16–21 years. Most were Italian (91%, $n = 505$); others self-identified as North European Italian (7%, $n = 38$), North African Italian (1%, $n = 6$), and Asian Italian (1%, $n = 5$).

Instruments

Goals for future design of the 2030 agenda (GFD)

The items have been inspired by the 17 Sustainable Development Goals set out in the 2030 Agenda. Initially, 34 items were developed, two for each goal. Distinct studies

suggested different methodologies to guide the item generation in the scale development process we used in the present study: literature reviews (Sheatsley, 1983) and expert opinion (Fink, 1995; Rea & Parker, 1997). The first one was based on the description of the relevant domain and the identification of items through a literature review. The second one involved the discussion of the items with the expert focus groups, that were psychologist with a post-master's degree in vocational guidance and career counseling. It is considered best practice to combine both deductive and inductive methods to define the domain and identify the questions to assess it. Furthermore, the items identified by the literature review and expert opinion approaches should be broader and more comprehensive than one's theoretical view of the target (Clarke, 1995). Furthermore, according to Kline (2013), we developed an initial pool of items twice (34) as the desired final scale (17).

A five-point scale was selected as the response format, with 1 indicating that each objective has little influence on educational and career design and 5 indicating a high influence on educational and career design. A focus group was conducted with 20 high school students (10 boys and 10 girls, M_{age} = 17.70, SD = 0.36) to ensure the clarity of the items and detect potential overlaps, ambiguities, or redundancy among them. This permitted the conducting of content assessments to quantitatively assess the content adequacy of a set of newly developed items (Schriesheim et al., 1993). During the focus group, respondents were asked to rate the extent to which the items corresponded with construct definitions. At the end of this stage, the 17-item scale was reached, no new items were suggested, and all the 17 items regarding sustainable development resulted to be adequate in comprehension. The items were retained for subsequent administration to an additional sample.

Career Adapt-Abilities Scale (CAAS-Italy for adolescents; Soresi et al., 2012)

It consists of 24 items, the same as in the Career Adapt-Abilities Scale—International Form 2.0 and Italian Form (Savickas et al., 2012; Soresi et al., 2012). Participants responded to each item on a scale ranging from 1 (not strong) to 5 (strongest). The 24 items combined into a total score indicating career adaptability and into four subscales that measure specific adapt-ability resources: concern (e.g., "Realizing that today's choices shape my future"), control (e.g., "Counting on myself"), curiosity (e.g., "Investigating options before making a choice"), and confidence (e.g., "Working up to my ability"). The CAAS-Italy adolescents showed good reliability ranging from 0.69 to 0.81 for the four subscales and 0.91 for the total score. Cronbach's α was 0.84, 0.80, 0.84, and 0.85 for the four subscales and 0.93 for the total score of this sample.

Planned happenstance career inventory (Kim et al., 2014)

It consists of 25 items representing the five skill domains and their subordinate constructs as defined in the happenstance theory (Mitchell et al., 1999): curiosity (e.g., "I am interested in new activities that might help make career decisions"), persistence (e.g., "I would persist in my efforts despite any unexpected barriers"), flexibility (e.g., "I am flexible about considering multiple options rather than pursuing

only one career path"), optimism (e.g., "My future career is bright"), and risk-taking (e.g., "I am willing to take risks despite the consequences being uncertain"). Previous analyses (Authors, 2019) confirmed the construct validity, through a confirmatory factor analysis [$\chi^2(350) = 843.541$, $p < 0.001$; root mean square error of approximation (RMSEA) = 0.067, 90% confidence interval (CI) 0.062–0.072, comparative fit index (CFI) = 0.90] in a sample of Italian adolescents. For this sample, Cronbach's α was 0.70, 0.91, 0.70, 0.85, and 0.78 for the five subscales.

Procedures

The GFD was included, with the other scales, in a survey administered to high school students who voluntarily participated, signing the consent form for the career counselling and vocational guidance activities implemented at school. They were also told their answers would be used to draw up personalized reports they would receive confidentially.

Of the 610 participants who agreed to participate, 559 finished all assessment battery components (91.6%). Of the 11 incomplete protocols, 9 participants answered "I agree" to participate and completed the demographic sheet but failed to fill out any assessments, and 2 filled out just some of the measures. Following Rubin (1976) and Sterner (2011), the missing data would appear to fall in the "missing at random" category since participants failed to provide significant portions of information, and there was no identifiable pattern. Given the large data set and the low percentage of incomplete protocols, we used listwise deletion as the remediation method. Our final analyses were conducted on the 554 participants who provided complete and consistent responses.

Data analysis

First, the sample was randomly divided into two subsamples. The sample was divided into two groups with sample sizes of 200 and 354 to conduct, respectively, exploratory factor analyses (EFA), and confirmatory factor analyses (CFA). Chi-squared tests and independent *t*-tests revealed no significant differences between the two split samples.

Second, construct validity was analyzed through an exploratory factor analysis (EFA), performed to determine the number of factors to be extracted. MPlus provided a sequence of EFA for different factors from 1 to a user-defined number of variables. For each analysis, Mplus reported fit statistics and factor loadings. We conducted the EFA using principal axis factoring and an oblique rotation method, and we adopted 0.10 cutoff points of the factor loadings. To help identify a target item pool, we deleted item loadings below 0.10, and/or with cross-loadings on other factors exceeding 0.25 (Pett et al., 2003).

Third, with the second split sample, we performed CFA using Mplus to examine the goodness-of-fit of the model and the full information maximum likelihood function (Schlomer et al., 2010). The analysis was performed with Mplus for variables with maximum likelihood estimation. We compared two models for

the internal structure of the GFD—the hypothesized model and an alternative model. The hypothesized model (labeled H: 17-4-1) assumes that the 17 items can be clustered into the four subscales that represent a single factor—namely, the four first-level factors can be combined into a single second-order factor. The alternative model suggests that all four subscales are required to adequately characterize an individual's career inclusion and sustainability profile. To determine the degree of the model fit, we adopted a cluster of criteria on goodness-of-fit statistics: normed chi-squared [χ^2/probability density function (pdf)] ≤ 3, a comparative fit index (CFI) ≥ 0.90, a Tucker–Lewis index (TLI) ≥ 0.90, a root mean square error of approximation (RMSEA) ≤ 0.08, and a standardized root means square residual (SRMR) ≤ 0.06 (Hu & Bentler, 1998; Schermelleh-Engel et al., 2003). According to Schumaker and Lomax (1996), a χ^2/degrees of freedom (df) ratio between 1 and 5 indicates that the hypothesized model fits the data, and RMSEA values below 0.08 indicate a good fit (Cudeck & Brown, 1993).

Lastly, we examined the degree of independence of the GFD scale and the relations between the Career Adaptability Scale and the Planned Happenstance Career Inventory. In line with Cohen (1992), correlation coefficients were considered of moderate magnitude when in the range between 0.30 and 0.49, and of weak or small magnitude when below 0.29, and coefficients of 0.50 or larger were considered to represent a strong or large correlation.

Moreover, means, standard deviations, and Cronbach's α internal-consistency reliability of the scale were calculated.

Results of study 1: exploratory factor analysis and internal consistency

Exploratory factor analysis (EFA)

The four-factor model solutions had a very good fit, with a root mean square error of approximation (RMSEA) below 0.08, a Comparative Fit Index (CFI) over 0.95, and a Tucker–Lewis index (TLI) ≥ 0.90. Parsimony considerations pointed to a four-factor solution. It met statistical criteria for good model fit: $\chi^2(200) = 102.503$, $p < 0.001$; RMSEA = 0.058, 90% CI 0.038–0.078, CFI = 0.970, and TLI = 0.91. The four factors were reasonably coherent with sustainability's four theoretical main domains. We labelled the factors social/health (2 items), environment/nature (6 items), human rights and equal economic development (7 items), and policy and democracy (2 items). All items had salient loadings on their latent constructs, ranging from 0.30 to 0.82. Tables 1 and 2 reported item cross-loadings. Means and standard deviations of each factor were as follows: social health: $M = 6.73$, SD

Table 1 Exploratory factor analysis: model fit results

Number of factors	χ^2	Df	p-Value	χ^2/df	RMSEA	CFI	TLI	SRMR
Social/health	654.953	119	0.0000	5.50	0.150	0.614	0.559	0.124
Environment/nature	334.762	103	0.0000	3.25	0.106	0.833	0.780	0.065
Human rights/equal economic development	251.518	88	0.0000	2.85	0.096	0.882	0.818	0.048
Policy and democracy	138.324	74	0.0007	1.86	0.066	0.954	0.915	0.032

RMSEA root mean square error of approximation, *CFI* comparative fit index, *TLI* Tucker–Lewis index, *SRMR* standardized root-mean-squared residual

Table 2 Factor loadings of exploratory factor analysis of the 17 items

Item	Factor 1 Social/health	Factor 2 Environment/nature	Factor 3 Human rights/equal economic development	Factor 4 Policy and democracy
2	**0.605**	0.115	0.115	0.036
3	**0.786**	0.150	0.150	−0.137
6	0.433	**0.704**	0.310	−0.262
7	0.338	**0.820**	0.230	−0.183
12	0.256	**0.718**	−0.575	−0.248
13	0.039	**0.785**	−0.430	0.132
14	0.065	**0.789**	−0.108	0.214
15	−0.118	**0.784**	−0.147	0.070
1	0.113	0.110	**0.307**	−0.110
4	0.135	0.216	**0.534**	−0.352
5	0.070	0.220	**0.506**	−0.561
8	0.096	−0.266	**0.323**	−0.262
9	0.104	0.192	**0.718**	0.195
10	0.162	0.056	**0.408**	−0.355
11	−0.248	0.136	**0.307**	−0.219
16	0.036	0.122	0.074	**0.393**
17	0.158	0.246	−0.197	**0.303**

=1.92; environment/nature: M = 19.99, SD = 5.521; human rights and equal economic development: M = 24.83, SD = 4.57; and policy and democracy: M = 6.71, SD = 2.17. Means and standard deviations suggested the absence of ceiling or floor effects. The intercorrelation among the factors ranges from 0.155 to 0.602. Cronbach's α internal-consistency reliability for the factors was as follows: social and health 0.70, environment/nature 0.91, human rights and equal economic development 0.75, and policy and democracy 0.79.

Table 3 Fit indices for confirmatory factor analyses of the Goals for Future Design of the 2030 Agenda

Model	χ^2	Df	p-value	χ^2/df	RMSEA	CFI	TLI	SRMR
17-4	167.681	69	0.0000	2.43	0.073	0.898	0.869	0.054
17-4-1	188.416	70	0.0005	2.69	0.069	0.906	0.901	0.053

RMSEA root mean square error of approximation, *CFI* comparative fit index, *TLI* Tucker–Lewis index, *SRMR* standardized root-mean-squared residual

Table 4 Standardized coefficients for the 17 items of the confirmatory factor analysis

Item	Standard deviation
1	0.306
2	0.429
3	0.341
4	0.827
5	0.767
6	0.557
7	0.414
8	0.418
9	0.581
10	0.847
11	0.789
12	0.808
13	0.700
14	0.463
15	0.371
16	0.660
17	0.360

Results of study 2: confirmatory factor analysis and concurrent validity

Confirmatory factor analyses

The fit indices for confirmatory factor analyses are reported in Table 3. As shown in Table 4, all the factor loadings were significant and presented loadings of > 0.30, suggesting that the items represented the four factors well. The hypothesized model (H: 17-4-1) fits the data better than the 17-4 alternative model ($\Delta\chi^2(1) = 21$, $p > 0.05$). Cronbach's α internal-consistency reliability for the total score was 0.93.

Concurrent validity: associations between the GFD, the career adapt-abilities scale, and the planned happenstance career inventory

Table 5 shows the correlations between the total score of the GFD and the subscales of the Career Adapt-Abilities Scale and the Planned Happenstance Career Inventory.

Positive and small correlations (Cohen, 1992) were found between the tendency one has to consider the systemic challenges to attain sustainable development in career design and the subscales of the Career Adapt-Abilities Scale and the Planned Happenstance Career Inventory, showing adequate concurrent validity.

Discussion

Sustainable development has become an essential topic in both academic and practitioner literature in the field of vocational guidance and career counselling (e.g., Međugorac et al., 2019; Van der Heijden et al., 2020; Verdín et al., 2020) as also highlighted by the United Nations (2015) and the 2030 Agenda. However, there are no measure assessments in the Italian vocational guidance activity despite the importance of this topic.

This study aims at analyzing the GFD scale to assess adolescents' propensity to measure how much each item can affect their future educational and professional design. The sample was composed of 554 Italian high school students. Specifically, a scale of 17 items that recalls the 17 Sustainable Development Goals was developed. Participants indicated on a 5-point Likert scale how much each of them may impact their future educational and career design. Means and standard deviations reflected variation in the adolescents' responses around the midpoint (Terwee et al., 2007). Initial EFAs showed a four-factor structure of the 17 items of the GFD. The four factors that emerged in said EFAs appeared relatively stable, well-defined, and conceptually coherent. We labelled these four factors social/health, environment/nature, human rights and equal economic development, and policy and democracy.

Study 2 was conducted to examine the stability of the 17-item factorial structure of the GFD. The confirmatory factor analysis showed that the 4-factor structure yielded with the first sub-sample was stable with the second sub-sample of Italian high school students.

The confirmatory factor analyses confirm the four-factor first-order structure (social/health, environment/nature, human rights and equal economic development, and policy and democracy) and a single-factor second-order structure (tendency toward sustainability and inclusion), showing good statistical fit indices. Furthermore, the total score of the scale and the four factors showed good reliability considering their Cronbach's α coefficient. These results align with the four-dimensions model highlighted by Grindheim et al. (2019), also reported by the United Nations Educational, Scientific, and Cultural Organization, which stated that all four dimensions are necessary for sustainability.

Regarding concurrent validity, the correlation patterns were in line with our predictions, as the tendency toward sustainability and inclusion correlated with the Career Adapt-Abilities Scale and the Planned Happenstance Career Inventory. The

Table 5 Correlations among Goals for Future Design of the 2030 Agenda, Career Adapt-Abilities Scale, and Planned Happenstance Career Inventory

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. 2030 Agenda goals	0.58**	0.86**	0.87**	0.71**	0.14**	0.24**	0.11*	0.23**	0.15**	0.13**	0.13**	0.08	0.15**	0.07
2. Social/health	–	0.41**	0.42**	0.25**	0.06	0.11*	0.08	0.11*	0.11*	0.11*	0.14**	0.05	0.12**	0.06
3. Environment/nature		–	0.54**	0.48**	0.10*	0.19**	0.05	0.13**	0.093*	0.05	0.05	0.01	0.09*	0.02
4. Human rights/equal economic development			–	0.64**	0.15**	0.21**	0.12**	0.25**	0.13**	0.14**	0.14**	0.10*	0.14**	0.08
5. Policy and democracy				–	0.13**	0.22**	0.16**	0.27**	0.16**	0.16**	0.15**	0.13**	0.16**	0.11*
6. Optimism					–	0.13**	0.56**	0.27**	0.42**	0.46**	0.42**	0.43**	0.30**	0.39**
7. Flexibility						–	0.01	0.50**	0.17**	0.04	-0.08	-0.02	0.24**	0.02
8. Persistence							–	0.37**	0.50**	0.50**	0.43**	0.44**	0.40**	0.43**
9. Curious exploration								–	0.45**	0.26**	0.12**	0.19**	0.39**	0.19**
10. Risk-taking									–	0.44**	0.32**	0.38**	0.41**	0.37**
11. Career adaptability total score										–	0.84**	0.86**	0.81**	0.88**
12. Concern											–	0.61**	0.54**	0.64**
13. Control												–	0.601**	0.72**
14. Curiosity													–	0.65**
15. Confidence														–

***p < 0.001; **p < 0.01; *p < 0.05

correlation matrix also shows that, as expected, higher levels of a tendency to consider the systematic challenges in educational and career design to attain sustainable development are connected to higher levels of career adaptability and planned happenstance skills. These results are in line with the study of Giangrande et al. (2019) that highlights that global sustainability goals can be achieved only through personal transformation and a shift in the consciousness of an individual that leads to support people in coping with the global changes and the uncertainty of the future, in which education plays an essential role.

Implications for practice

The scale observed psychometric indices to support its use in vocational guidance and career counselling activities to promote adolescents' life design in a sustainable and inclusive way. It may also be helpful to promote reflections on career knowledge and skills useful in the future world of work for personal well-being and to achieve prosocial benefits (Savickas et al., 2009; Nota et al., 2020). In addition, this instrument could help investigate thoughts, ideas, and feelings high school students have about their future and their propensity to consider future challenges and the contextual factors that could affect their futures transitions. In pre- and post-test sessions, it could also be helpful to verify the effectiveness of career education programs to strengthen high school students' aspirations for a sustainable and inclusive future, improving critical consciousness, and decent work leading to an opportunity that positively affects work fulfillment and general well-being. Finally, the research could examine future career design indicators and psycho-social and professional issues in adolescents.

Limitations and directions for future studies

One limitation of the current study is that the samples were homogeneous in age and educational level. Besides, some potentially critical demographic features (e.g., income level) were not assessed. Therefore, this study does not provide information about the reliability, factor structure, and construct validity of the 17-item scale regarding adults, individuals from specific ethnic minority groups, and individuals with different education and income levels. The fact that the scale is based on self-reported information should not be underestimated. Future studies should then use a combined approach by adding information gathered from measures or indices derived from the analysis of youth attitudes toward sustainability that add more direct information. Another limitation of this study is that the factors of social/health and policy and democracy are obtained by two items. Even if the α value reported in the present study is good for both factors, as suggested by Hair et al. (2010), the three abovementioned items provide minimum coverage of the construct's theoretical domain. Moreover, additional research is needed to investigate the invariance measure models. Finally, test–retest measures should also be introduced in further research studies.

Appendix: Goals for Future Design of the 2030 Agenda

Thinking about your future and what may happen, consider and reflect on every single one of these items and indicate how much each of these themes could also influence your future education and career design.

In replying, consider the meaning associated with the following numbers:

1 = almost not at all
2 = little
3 = enough
4 = very
5 = very much

1. How much could the issue of access to economic resources and their more equitable distribution influence your future education and career design?
2. How much could the theme of nutrition and the distribution of safe and nutritious food influence your future education and career design?
3. How much could the topic of health promotion influence your future education and career design?
4. How much could the topic of access to quality education for everybody influence your future education and career design?
5. How much could the theme of pursuing effective gender equality influence your future education and career design?
6. How much could the topic of water resources management influence your future education and career design?
7. How much could the topic of renewable energy influence your future education and career design?
8. How much could the topic of promoting decent work influence your future education and career design?
9. How much could the theme of sustainable and inclusive economic growth influence your future education and career design?
10. How much could the theme of reducing inequality influence your future education and career design?
11. How much could the theme of building sustainable, inclusive, accessible cities influence your future education and career design?
12. How much could the theme of waste management and sustainable and appropriate use of natural resources influence your future education and career design?
13. How much would the topic of climate change and pollution influence your future education and career design?
14. How much could the theme of water and ecosystem protection influence your future education and career design?
15. How much could the topic of sustainable management of terrestrial ecosystems influence your future education and career design?
16. How much could the theme of reducing injustice and promoting peace influence your future education and career design?
17. How much could the theme of quality international cooperation influence your future education and career design?

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