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ARTICLE

Undergraduates' academic socialization. A cross-time analysis

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Abstract

Background: Socialization practices support undergraduates' transitional processes when beginning their academic careers and afterwards. Anyhow, the absence of specific socialization measures for academic contexts does not allow Universities to assess it.

Aims: The present study aimed to contribute to the socialization literature by proposing a reliable measure (USQ, Undergraduate Socialization Questionnaire) specific for the academic context, that is, reflecting the same construct at different developmental stages.

Method and samples: Based on an organizational socialization scale (NSQ; Haueter al., 2003, *Journal of Vocational Behavior*, 63, 20), we examined in Study One the USQ's three-factor structure (task, group, organization) (n. 451 undergraduates) and, in Study Two, we tested the construct invariance across time, comparing undergraduates' developmental changes through a two-wave longitudinal design (n.185 undergraduates attending their first and their second year).

Results: Findings supported both the USQ's dimensionality and measurement invariance, thus ensuring that the same underlying construct is being assessed, and its concurrent and predictive validity.

Conclusions: Overall, results showed that USQ is a reliable instrument useful to monitor the effectiveness of

undergraduates' adjustment process, also allowing comparison between specific groups of students or longitudinal comparison to evaluate their career development or the effectiveness of policies targeted to reduce the risk of marginalization and dropout.

KEYWORDS
academic socialization, across groups comparison, longitudinal comparison, measurement invariance, questionnaire, undergraduates

INTRODUCTION

In the last decades, a considerable body of literature on organizational socialization has established its prominent role in supporting newcomers' entry, leading to positive attitudes towards their job (e.g. performance, affective commitment, job satisfaction), a deeper understanding of organizational policies and culture, and overall better performance (Batistič & Kaše, 2015; Bauer et al., 2007; Wanberg, 2012). This construct, indeed, relates to the management of an individual's transition into a new group, and to all the processes of mutual person-group adaptation, identification, and the proper behaviours to adopt allowing a new member to be accepted as a full member of a group (Moreland & Levine, 2001; Wanberg, 2012). In work contexts, inadequate or ineffective socialization heightens the risk of marginalization or exit from the group by phenomena such as withdrawal, absenteeism, intention to quit, burnout, role conflict or counterproductive behaviours (Bauer et al., 2007; Farnese et al., 2017; Livi et al., 2018; Tomietto et al., 2015). The transition from high school to university, as well, implies an academic socialization process involving the management of new learning skills and strategies, the acceptance of one's classmates, the understanding of university norms and policies, and the feeling of alignment with values within the academic context. Indeed, the University represents an organizational context not only for its workers (e.g. teachers, researchers, administrative employees, etc.) but also for undergraduates, who, like all newcomers entering an organization, initiate new learning tasks and goals.

The effectiveness and the extent to which students complete their programs of study is a relevant issue for policymakers (Yorke, 1999). For instance, almost 30% of European bachelor students do not complete their academic courses and most of them leave after the first year (Vossensteyn et al., 2015). Also in Italy, the country where this study was carried out, although a clear improvement in the regular completion rate trend (from 39.2% to 55.7% over the past ten years; AlmaLaurea, 2020), statistics reveal that early dropouts mainly occur after the first year in about half of the cases (Anvur, 2018). The Europe 2020 Strategy (2020) upholds the political concern for students' success, and a particular interest in their first-year transition (Trautwein & Bosse, 2017), acknowledging the increasing completion rates in higher education as one of the crucial goals for creating high-level skills that knowledge-intensive economic sectors need.

Since Weidman's (1989) seminal work, several scholars have studied students' socialization processes within their academic careers. The literature has shown that this process allows undergraduate students to progressively adjust themselves to fit their new role within the university organization, leading students to successfully adapt to the new context and enhance their performance (Bogler & Somech, 2002; Gruman et al., 2006). In contrast, lack of integration into the academic and social systems affects academic dropout (Tinto, 1975) or withdrawal (Harrison, 2006). Research on the socialization process in university studies mainly focused on distal outcomes of socialization (e.g. academic success, satisfaction, wellbeing) and related factors (e.g. personal characteristics, individual tactics, organizational tactics). Yet, it overlooked the direct outcomes of socialization, namely the ongoing degree of students' learnings achieved on main socialization domains to act appropriate role behaviour. In our opinion, one

of the main reasons for this is that undergraduates' socialization has never been captured by a specific instrument devoted to operationalizing and tapping directly this construct.

This gap in the literature raises three issues. First, existing research proposes a misleading 'logical gap' in describing a process that links possible socialization factors (e.g. students' social characteristics) and strategies (e.g. socialization tactics such as university's orientation or mentoring programs, newcomers' information seeking) aimed at uncertainty reduction, directly to possible outcomes (e.g. academic achievements, satisfaction), neglecting the mediational step of socialization itself. Second, socialization is the expression of an adjustment process between the individual and his/her social context (the group they are going to enter and related norms), thus a context-sensitive instrument is needed to capture the unique relationship that an individual has with the specific socialization domain, in our case their university career and the group of colleagues. The third issue is that socialization is often used as an overlapping construct with other adjustment measures used in educational literature that, as we will show later, capture a more specific part of students' integration in the academic context. Hence, the first aim of this study is to propose a socialization measure – the USQ-Undergraduate Socialization Questionnaire – specific for the academic context, borrowing the multidimensional model of socialization as conceptualized by Haueter et al. (2003) for the more general organizational entry.

Furthermore, studies on socialization assume that this construct, although reflecting a dynamic process, may be measured in its development, regardless of the socialization stage newcomers are in. For instance research adopting a longitudinal design, or comparing employees with different tenures, or testing differences in groups at different stages of socialization through the same questionnaire (Moreland & Levine, 2001; Saks et al., 2007), assume that it reliably captures the essence of the socialization construct. Nevertheless, their measurement equivalence cannot be taken for granted, assuming that the nature of the construct does not change when considering its development, that is, 'the measure reflects the same construct at each occasion' (Widaman et al., 2010, p.10) is inadequate. Thus, the second aim of this paper seeks to ensure that in longitudinal research the construct generalizes across time (Vandenberg & Lance, 2000) by specifically testing whether the USQ demonstrates measurement equivalence in assessing undergraduates' socialization across different stages of their academic career development.

In the following paragraphs, we will introduce the theoretical underpinnings and then report results related to the validation of the adapted version of the Newcomer Socialization Questionnaire by Haueter et al. (2003) to undergraduate students (Study One) and discuss its measurement equivalence by assessing undergraduates' socialization across different stages of their academic career (Study Two).

THEORETICAL FRAMEWORK

Measuring undergraduate socialization

Studies in the academic context showed that effective socialization factors support both students' adjustment into the social system of the college and students' integration into the explicit and implicit social norms of the academic context (Day & Livingstone, 2003; Padgett et al., 2010; Tinto, 1975; Weidman et al., 2014). In turn, these adjustment processes affect several positive distal outcomes such as students' well-being, emotional adjustment, and perceived social support (Larose et al., 2019; Ramsay et al., 2007); higher academic achievements, such as learning outcomes, perseverance, academic satisfaction, intention to persist, and marks and other objective indicators (Bogler & Somech, 2002; Larose et al., 2019; Rooij et al., 2018; Terenzini et al., 1996); and more positive attitudes towards studying, such as motivation, engagement, and satisfaction (Bogler & Somech, 2002; Gruman et al., 2006). It also strengthens students' pre-professional identity, steering their choices, opportunities, and future career path, and contributing to their socialization into a profession (Barretti, 2004; Lindberg, 2009; Weidman, 1989).

Overall, scholars in their research referred to all these different phases of the socialization process, mostly focusing on the result of a good student/context fit, namely undergraduates' degree of

adjustment (Bauer et al., 2007). They often based their findings on constructs closely related to student's adjustment, assumed to be indicators of it (e.g. task-mastery, satisfaction, turnover intention; Bogler & Somech, 2002). Rarely, scholars have adopted specialized measures that try to tap directly academic socialization itself. Most researchers used a global one-item measure yet acknowledged adjustment as a complex and multifaceted concept (e.g. Ramsay et al., 2007). One notable exception is represented by Baker and Siryk's (1984, 1986) *SACQ–Student Adaptation to College Questionnaire*, a measure of undergraduates' adjustment. It is composed of four subscales, two of them specifically measuring the adjustment process (demands related to different aspects of their college experience, respectively, towards their academic work and towards the college social life); the third about their personal wellbeing (emotional and physical); and the fourth about students' institutional attachment, namely the quality of relationship with the academic context and commitment to the educational goals. Specifically, the academic adjustment subscale taps undergraduate's personal attitudes towards the academic work, the perceived effectiveness of their efforts and the degree of satisfaction of their expectancies related to what the academic environment is offering (e.g. program of courses). The social adjustment scale taps undergraduates' success in social activities and interpersonal relations, also coping with social demands related to college life (e.g. lonesomeness from home). Several studies on undergraduates' adjustment adopted the SACQ or some of its subscales in different countries (among others, Larose et al., 2019; van Rooij et al., 2018). Although reliable, the scale is aimed to measure undergraduate's adaptation in terms of role adjustment, which is a key but also a distal consequence of the socialization process (see King & Sethi, 1998).

Bogler and Somech (2002) proposed a measure for *Socialization Tactics* reflecting different students' actual behaviour oriented to the adjustment in university life. The three subscales it is composed of are related to key motives of study: scholastic socialization (tactics aiming at expanding students' knowledge), instrumental socialization (tactics aiming at making easier the study in order to soon acquire a profession) and collegiate socialization (tactics aiming at developing social relationships with other students and be active in social campus activities). Hence, the scale gives an important contribution to understanding the behaviours that support socialization, which is a prominent behavioural predictor yet not socialization itself.

In sum, although the general theoretical framework for the socialization process is well established, few scholars proposed a direct socialization measure, the others basing their findings on constructs closely related to the wider socialization process such as socialization tactics and individuals' attitudes as enabling or hindering factors, and indicators of its effectiveness (e.g. task-mastery, satisfaction, turnover intention, wellbeing). Thus, to assess students' degree of learnings achieved on main academic socialization domains and to adequately test models, reliable, and specific measures are needed. On the other hand, the adoption of already existing socialization measures capturing this process in other contexts, such as workplaces, could lead to misleading findings due to the transactional nature of this construct, which reflects the specific actor–context relationship.

Drawing from the literature depicted above and highlighted issues, the present study aimed to generate a socialization scale specific for the academic context, borrowing from existing organizational socialization instruments. Indeed, since the 1990s, some organizational socialization models, with associated measures, have been proposed, mainly focusing on employees' understanding of the way their organization functions, task learning, and social integration (Chao, 2012; Cooper-Thomas & Anderson, 2006). The most widely used measures have focused on socialization content domains, such as performance proficiency, politics, language, people, organizational goals/values, and history (*CAS–Content Area of Socialization*; Chao et al., 1994); perceived effectiveness of training, understanding, co-worker support, and future prospects (*OSI– Organizational Socialization Inventory*; Taormina, 1994, 2004); competence, identification, and social acceptance (*OSQ- Organizational Socialization Questionnaire*; Livi et al., 2018); knowledge about role, social, interpersonal resources, and organization (*EAS—Employee Adjustment Survey*; Cooper-Thomas & Anderson, 2002, 2006); or role clarity, relationship with co-workers and organizational understanding (*NUIS*; Cooper-Thomas et al., 2019). The *NSQ–Newcomers Socialization Questionnaire* by Haueter et al. (2003), aimed to overcome some of the limitations of previous measures, focusing on the social level wherein the socialization occurs. It assumes that role adjustment may occur

at the task, team (or unit or department), and organizational levels. As such, the learning contents and related role behaviour that newcomers need to master could be distinctive at each level. Specifically, the *task socialization* domain is related to acquiring the specific knowledge and skills necessary to perform own job; the *group socialization* is related to learning explicit and implicit group's norms to properly behave; and the *organization socialization* domain is related to learning values, goals, politics, and language of the organization.

Given that the NSQ is the only comprehensive socialization measure that explicitly considers a multi-level perspective, we draw from this measure to operationalize a multidimensional scale for socialization in the academic context, the *USQ – Undergraduate Socialization Questionnaire*. Study One depicts the generation process for the USQ and tests its three-factor structure measurement invariance and convergent and discriminant validity, in a sample of university students.

Socialization, a dynamic construct

A core feature of the socialization construct is its dynamic nature, capturing the process that, from the pre-entry stage, leads to full membership (or marginalization). Many scholars have cross-sectionally focused on the early entrance phase, assuming that this is the most critical transition stage newcomers have to cope with, and that the degree of socialization in the early stages will be relatively stable and a prominent factor in determining later outcomes (Cooper-Thomas & Anderson, 2006; Farnese et al., 2016; Grayson, 2003; Larose et al., 2019; Trautwein & Bosse, 2017). Other scholars have considered the diachronic development of socialization, comparing groups at different stages of socialization, as in the case of teams composed by newly hired and old tenured employees (e.g. Haueter et al., 2003); by students attending different grades of a school (e.g. Bess, 1978); or by analysing individual changes across time, as in the case of school-to-work or work-to-work transitions, or in testing the effectiveness of training courses (Moreland & Levine, 2001). Nevertheless, when comparing independent groups or adopting a longitudinal design, a reliable measurement capable of capturing the same construct in different developmental stages, is needed. If measurement equivalence is not tested, its generalizability cannot be assumed (Vandenberg & Lance, 2000; Widaman et al., 2010).

To the best of our knowledge, only one study has tested the measurement invariance of a socialization scale, verifying the equivalence of the NSQ while comparing a group of newly hired and tenured employees (Spagnoli et al., 2018), thus providing initial support for generalization across time, despite not adopting a longitudinal design. Thus, Study Two aimed to assess whether the USQ can be a meaningful measure for undergraduates' socialization across time, through testing its invariance in a longitudinal comparison between students at the beginning of their academic career (T1) and in further stages (T2). Moreover, in Study Two, we were able to verify the predictive validity of the USQ by testing the relationship between each of the three subscales measured in T1 and the three outcomes measured in T2.

STUDY 1

Study One aimed to propose the Undergraduate Socialization Questionnaire (USQ), based on an organizational socialization questionnaire (the NSQ by Haueter et al., 2003). The psychometric properties and factorial structure of the USQ were assessed in a sample of Italian university students, and its relationship with other socialization indicators and objective measures were investigated to verify its convergent and discriminant validity.

For convergent validity, we took into account proximal socialization indicators: *Information seeking*, which taps the need for information and learning about the new context (Bauer & Erdogan, 2012); *Attendance* (frequency with which students attended their classes) and *Hours of study* (amount of time daily spent studying), motivational indicators of student's commitment towards their learning task (Bogler & Somech, 2002); *Peer support*, that refers to the quality of interactions with colleagues and to the feeling

of being accepted as part of a group, thus capturing the relational socialization feature (Chao et al., 1994; Taormina, 2004); and *Trustworthiness in teachers' ability*, that refers to the course reputation and acknowledgement of teachers' professional competence (Mayer & Davis, 1999). We also considered some distal academic socialization outcomes: student's *Performance* (learning achievement expressed by mean grade), *Satisfaction* in the university course, and perception of *Future employability*. We hypothesized that all outcomes would be related, as core-related constructs, to the USQ overall measure. To test the multidimensionality of the USQ, we also hypothesized that some outcomes would be more strongly related to specific subscales (in particular, study performance and hours of study with USQ-Task; attendance frequency and peer support with USQ-Group; and teachers' trustworthiness with USQ-Organization). Additionally, we examined discriminant validity by verifying whether the scales have low or no correlations with variables that are theoretically unrelated to them. As, in theory, demographic variables should not demonstrate significant relationships with socialization, we hypothesized that gender would be unrelated to the USQ overall measure and its subscales.

Method

Items generation

The scale development consisted of three steps. In the first phase, the three NSQ socialization learning domains (i.e. task-, group-, and organizational-level) were adapted to the academic context. The *task undergraduate socialization* domain (USQ-T) is related to acquiring the knowledge and skills necessary to perform the student job, such as understanding students' main responsibilities and priorities and identifying relevant information sources. This domain captures the undergraduate-task relationship; thus, it seems close to the meaning of the SACQ's academic adjustment dimension. The *group undergraduate socialization* domain (USQ-G) captures the undergraduate-team relationship, being related to learning about the explicit and implicit norms within the class, values in use, and appropriate behaviour. It differs from both the SACQ social adjustment dimension and from the Bogler and Somech (2002) collegiate socialization dimension, because they tap students' success in social relations, whereas the USQ team level taps students' integration in social norms, behavioural standards, and learning goals, letting easier the academic achievements. Furthermore, it does not focus on college life but on the learning community students are part of, not assuming that university courses are held in a college setting (as Italian universities are the case). Finally, the *organization undergraduate socialization* domain (USQ-O) captures the undergraduate-academic context relationship, being related to knowledge about procedures, specific language, politics, and shared values of the Faculty or University. It focuses on the understanding of the organizational practices and policies, rather than on the student's attitudes towards their academic institution, as in the SACQ institutional attachment scale.

Afterwards, a team of students already graduated from Psychology and attending a master Psychology class were asked to generate a pool of items. For each NSQ item, they proposed one or more versions adapting them to the academic context (e.g. proposing specific examples or rewording them when needed) based on their undergraduate experience. Indeed, adopting an expert judge's procedure for developing measures (Hardesty & Bearden, 2004), students could be considered the main actors of the academic context. Furthermore, being psychologists, they had conceptual backgrounds on the socialization process and item generation methodological competence. Similar to the original scale, all items were positively worded.

Lastly, students rated the importance of each item for the construct of interest assessing how relevant the learning described in each item was for academic socializing in the analysed domain (task, group, organization), on the basis of their experience as students. A content and semantic evaluation were made by two of the authors as well, to assess items' consistency with the theoretical construct. Only items that were judged as clearly representative of the construct by the majority of the judges were included. All in all, the list of items was reduced to the final 18-items and three-dimensional scale (see Table 1).

TABLE 1 Undergraduate Socialization Questionnaire (USQ) items and factor loadings

	USQ -Org.	USQ -Group	USQ -Task
1. I know what this [Faculty] offers: training courses, services, and future professional opportunities. *Conosco quello che questa [Facoltà] offre: corsi di formazione, servizi e sbocchi professionali futuri.*	.59		
2. I know the structure of this [Faculty] (e.g. departments, secretarial offices, classrooms, dining hall, …). *Conosco le strutture di questa [Facoltà] (es. dipartimenti, uffici amministrativi, aule, mensa).*	.70		
3. I understand the organizational procedures of this [Faculty] (e.g. who does what, forms, schedules). *Comprendo le procedure organizzative di questa [Facoltà] (es. chi fa cosa, modulistica, tempi).*	.63		
4. I fit in with this [Faculty's] values and beliefs. *Condivido i valori e le credenze di questa [Facoltà].*	.46		
5. I know this [Faculty's] overall policies and/or rules (e.g. turn off mobiles, classroom behaviour). *Conosco le politiche e/o le regole di questa [Facoltà] (es. spegnere i cellulari, comportamento in aula).*	.63		
6. I understand the specific language shared in this Faculty (jargon, abbreviations). *Capisco il linguaggio condiviso di questa [Facoltà] (es. gergo, abbreviazioni).*	.57		
7. I share my colleagues' learning objectives. *Condivido gli obiettivi formativi dei miei colleghi.*		.46	
8. I know how to manage relationships within my group of colleagues. *So come gestire le relazioni all'interno del mio gruppo di colleghi.*		.68	
9. I am familiar with my [course] colleagues' competences (knowledge, skills). *Conosco le competenze (es. abilità, conoscenze) dei miei colleghi di corso.*		.57	
10. When working within a group, I know how to perform tasks according to group standards. *Quando si lavora in gruppo, so come svolgere compiti in linea con gli standard del gruppo.*		.82	
11. I know how to behave in a manner consistent with my work group's values and ideals. *So come comportarmi in maniera coerente con i valori e gli ideali del mio gruppo di lavoro.*		.80	
12. I know how to perform the basic tasks that my student work requires. *So come svolgere i compiti che caratterizzano il mio lavoro di studente.*			.69
13. I understand which commitments and responsibilities have priority in my student work. *Capisco quali impegni e responsabilità hanno priorità nel mio lavoro.*			.69
14. I have the basic methodological skills necessary to perform my student-related activities (e.g. writing, doing a literature review). *Ho le competenze metodologiche di base per svolgere le mie attività di studente (es. scrivere, fare una ricerca bibliografica).*			.66
15. I know how to acquire the information needed to perform my work. *So come acquisire le informazioni di cui necessito per svolgere il mio lavoro.*			.66
16. I know who to ask for support, when my student task requires it. *So a chi chiedere aiuto, quando ne ho bisogno per il mio lavoro di studio.*			.56
17. I know what my professors expect from me. *So cosa i professori si aspettano da me.*			.49
18. I understand how to complete necessary forms/paperwork (e.g. booking an exam, rejecting a grade). *So come compilare i documenti o la modulistica necessari (es. prenotazione di un esame, verbalizzazione, rifiuto di un voto).*			.51

Note: The referents in brackets (e.g. Faculty) may be changed due to the specific context of study (e.g. University or others).

A forward-backwards-forward approach was adopted. Two of the authors, independently, translated the original NSQ scale into Italian and reconciled the differences. The NSQ version was proposed to the team of master students as a base for the new scale development. The new Italian USQ version was backwardly translated into English by a mother-language expert. Finally, the authors compared the original version with the translated English version and made appropriate changes to the items in the Italian final version.

Procedure and participants

The present study used an exponential no-discriminative snowball sampling approach: psychology students attending a practical laboratory were invited to forward the overall survey to bachelor students from different kinds of faculties in their network. After 2 weeks, a total of 451 respondents had completed the survey. Most of them were female (63.9%), with a mean age of 23.26 years (*SD* = 2.893). They attended the three-year bachelor's degree (22.8% first year; 20.2% second year; 57.0% third year) of different departments (Psychology 29.0%; Social Sciences 12.2%; Medicine and Biology 11.8%; Economy 11.3%; Engineering 10.2%; Arts and Literature 10.2%; Law 8.9%; Others 6.5%).

Participants were informed that acceptance was voluntary and that the research was not commissioned by the University they were enrolled in. In addition, a research team member clarified that participants' responses would be kept confidential and anonymous and that data would always be reported in an aggregate form. They completed a paper and pencil questionnaire individually, after having signed the informed consent. The Ethics Committee of the Department to which the first author is affiliated approved the study.

Measures

Undergraduate Socialization Scale

The final version of the USQ includes three subscales, related to different academic socialization learning domains: the USQ-T captures the degree undergraduates feel socialized at the student's task level (seven items); the USQ-G captures the degree undergraduates feel socialized at the class level and with respect to relationships with classmates (five items); and the USQ-O captures the degree undergraduates feel socialized at the organizational level, namely Faculty or Course of degree (six items). Items are described in Table 1. Respondents were asked to specify their knowledge in each level. Response options were presented in a 5-point format, ranging from 1 = *strongly disagree* to 5 = *strongly agree*.

In terms of convergent validity, we measured the following variables: *Information seeking* was assessed by an adapted version of the Morrison (1993) scale, composed by 10 items rated on a 5-point frequency scale; *Attendance* and *Hours of study* were tapped by behavioural self-report single frequency items, respectively, 'Did you attend your course lessons in the last 6 months'? (rated on a 5-point frequency scale from 1 = Yes, it's mandatory to 5 = No, never) and 'How many hours a day do you study on average'? (rated on a 5-point frequency scale from 1 = Not at all to 5 = More than 6 hours a day); *Peer support* was measured by an adaptation of the OSI co-worker support subdimension, assessing how well the employee relates to other members in the organization (Taormina, 2004), composed by five items rated on a 5-point disagree/agree scale; and *Trustworthiness in teachers' ability* refers to skills, competencies, and characteristics that allow an individual to assert influence within this domain. It was measured by the Mayer and Davis' (1999) scale, composed of five items rated on a 5-point disagree/agree scale.

The distal academic socialization outcomes considered included: *Performance* (mean grade), *Satisfaction* in the university course (single item ranked from 1 = not at all to 5 = at all), and *Future employability*, an adaptation of the OSI future prospects subdimension, assessing the employee's long-term view with the organization (Taormina, 2004), composed by five items rated on a 5-point disagree/agree scale.

Data analyses

The USQ factorial structure and measurement invariance was examined through Confirmatory Factorial Analysis using structural equation modelling (maximum likelihood estimation). CFA represents a kind of structural equation modelling that specifically deals with measurement models, aiming to examine the relationship between observed measures and latent variables or factors. In particular, two models were compared: the three-dimensional original model and the alternative unidimensional model.

The indices of fit for testing the dimensionality of the USQ were the following: the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), and the Normed Chi-Square (X^2/df). CFI assesses the extent to which the tested model is superior to an alternative model in reproducing the observed covariance matrix (Bentler, 1990; McDonald & Marsh, 1990). The CFI index varies from 0 to 1 and a cut-off criterion of CFI >.90 is needed in order to ensure that inadequate models are not accepted (Hooper et al., 2008). The RMSEA introduces a correction for lack of parsimony since, all other things being equal, more complex models are penalized. A cut-off value close to.06 (Hu & Bentler, 1999) or an upper limit of.08 (Steiger, 2007) seems to be the general consensus among researchers. The Normed Chi-Square, or the Chi-Square to Degrees of Freedom Ratio (X^2/df), is a further version of the traditional Chi-Square, whose advantage is that it is less sensitive to the sample size. Lomax and Schumacker (2004) suggest that a Normed Chi-Square smaller than 5 is an index of a good fit.

Correlational analysis was conducted for testing convergent and discriminant validity. AMOS 20 was used to run both CFA and MCFA, whereas SPSS 20 was used for data managing, preliminary analyses of the data, correlational analyses, and reliability analyses.

Results

Factor structure of the USQ through Confirmative Factor Analyses

Evidence of the superiority of the three-dimensional hypothesized factorial structure was found. Although some of the fit indices were unsatisfactory for both models (unidimensional model: X^2/df = 7.551, CFI = .70, RMSEA = .12, AIC = 1091.420; three-factor model = X^2/df = 3.775, CFI = .875, RMSEA = .08, AIC = 576.301), the three-factor model showed a better fit and, according to the AIC index, prevailed with respect to the unidimensional model. Thus, following Haueter et al. (2003), modification indices were considered to improve the fit of the three-factor model and residuals between highly similar items (modification index >15) were allowed to covary (Kline, 1998). This resulted in six correlated residuals. The fit indices of the three-factor adjusted model including the six correlated residuals were satisfactory (CFI = .93; RMSEA = .059; X^2/df = 2.564).

Overall, as shown in Tables 1 and 2, factor loadings were all above.40 and each factor showed adequate psychometric properties. As expected, the three factors were moderately to highly correlated (see Table 2). Indeed, reliability was good (as attested by the alpha and mean composite reliability indices).

Convergent and discriminant validity

Following, correlation analyses were conducted to examine the USQ's construct validity. Overall, the results presented in Table 2 demonstrate that the USQ total measure significantly and positively correlated with each of the conceptually related variables. It was lower for behavioural factors (mean grade, course attendance, hours of study) and moderate for psychosocial factors. Furthermore, the absence of a significant correlation between the USQ scales and gender also provided evidence for discriminant validity. We also examined gender differences in the three subdimensions of the USQ. Results of the ANOVA showed no differences. Accordingly, construct validity was supported for all three scales.

TABLE 2 Reliability and psychometric indices for the three USQ subscales and correlations among variables

	USQ total	USQ -Task	USQ -Group	USQ-Organization
Mean	3.581	3.772	3.722	3.543
Standard deviation	0.501	0.592	0.628	0.660
Cronbach's alpha	.885	.808	.808	.786
USQ-Task	.837**	–		
USQ-Group	.755**	.565**	–	
USQ-Organization	.808**	.534**	.450**	–
Mean grade	.115*	.171**	.051	.075
Course attendance	.122**	.095*	.142**	.079
Daily hours of study	.107*	.168**	.062	.034
Information seeking	.314**	.256**	.230**	.256**
Peers' support	.351**	.261**	.505**	.140**
Trustworthiness in teachers	.280**	.141**	.115*	.250**
Course satisfaction	.240**	.154**	.141**	.200**
Future prospects	.410**	.332**	.201**	.331**

Note: *$p < .01$; **$p < .001$.

In comparing the correlations with each USQ subscale, some variables showed a stronger or unique relation with particular USQ subscales (namely, the mean grade and daily hours of study with the USQ-Task dimension; peer support and the degree of course attendance with the USQ-Group dimension; and teachers' trustworthiness with the USQ-Organization dimension). Thus, the subdimensions capability to tap unique relationships with related constructs also supported the usefulness of a multidimensional measure for undergraduate's academic socialization.

STUDY 2

Study Two aimed to assess the USQ reliability across time, verifying its measurement equivalence. Indeed, if the USQ demonstrates configural and metric invariance, this would imply that the measure has equivalent meanings across time (Vandenberg & Lance, 2000). In other words, the socialization construct is captured in the same way by the USQ, regardless of the student's socialization stage. This means that the measure would reflect the construct across time. Thus, in order to add generalizability to the results of Study One and extend them to longitudinal research, Study Two replicated the confirmative factor analysis on a different sample of 185 undergraduates surveyed in different stages of their socialization process: when they were newcomers (at the beginning of their first year; T1) and 12 months later while attending their second year of university (T2).

Specifically, we conducted a two-wave longitudinal comparison (rather than a cross-lagged between-groups comparison) given that socialization, by definition, is a process that expresses a dynamic adjustment between the individual and his/her social context, that is, 'a context-sensitive' construct (Louis, 1980). Thus, it was pivotal to follow each student in his or her socialization process.

To further contribute to the USQ's validity, we also verified predictive validity testing the relationship between each subscale and a related outcome indicator (namely, in line with Study One hypotheses, the USQ-T and satisfaction with study performance; the USQ-G and satisfaction with peer relationships; and the USQ-O and academic identification).

Method

Procedure and participants

Participants in Study Two included students from a bachelor course in Psychology. They were informed that participation was voluntary. In addition, a research team member clarified that students' responses would be kept confidential and anonymous and that data would always be reported in an aggregate form. Thus, the two paper and pencil questionnaires were completed individually in collective administrations during a class, after having signed the informed consent. At T1, when students were beginning their first year, n.311 surveys were returned. At T2, 12 months later, n.187 surveys were returned. After matching the two datasets, two incomplete surveys were deleted, thus data were available for 185 participants on the two waves. Most of them were women (75.1%) and their ages ranged between 18 and 38 years old (Mean = 19.70; *SD* = 2.001). The Ethics Committee of the Department to which the first author is affiliated approved the study.

Measures

Undergraduate Socialization Scale
We utilized the same USQ scale used for Study One.

Outcomes
Satisfaction with study performance and *Satisfaction with peer relationships* were measured by two scales from the College Satisfaction Scale by Lodi et al. (2017). Each scale is composed of three items (example items, respectively, are 'I am satisfied with my way of studying'; and 'I am satisfied with the relationships with my course colleagues'), rated on a 5-point scale (1 = Not at all true, 5 = Completely true). *Academic identification* was based on the six-item organizational identification scale by Mael and Ashforth (1992) adapted to the university context (example item: 'When someone praises this Faculty, it feels like a personal compliment'). The items were rated on a 5-point disagree/agree scale.

Data analyses

Longitudinal invariance of the factor structure of the USQ requires analysing data by fitting the two waves with two separate models simultaneously. Therefore, two separate factor models were constructed for T1 and T2 data with correlations between T1 and T2 factors. In addition, correlations were estimated among all possible pairs of uniqueness between T1 and T2, given the same items were used across two-time points (Pitts et al., 1996; Vanderberg & Self, 1993). The invariance routine involves testing and comparing models that impose successive restrictions on model parameters. Thus, measurement invariance, that is, configural, metric, and scalar invariance (e.g. Byrne, 2004; Davidov, 2008), was examined through Multi-group Confirmatory Factorial Analysis (MCFA). MCFA consists of simultaneous CFAs in two or more groups, offering a strong analytic framework for evaluating the equivalence of measurement models across groups (Brown & Moore, 2012). Configural invariance is achieved when the model holds in all the groups included in the analysis. The indices of fit for testing the dimensionality and configural invariance of the USQ were the same used for the assessment of the factorial structure conducted in Study One.

Following, *metric* and *scalar* invariance analyses were conducted to test if the factor loadings and the intercepts were the same in the two groups of participants. In order to test full metric invariance, the fit of a constrained model including all of the fixed factor loadings is compared to the fit of the free-to-vary model. Following Chen (2007) and Cheung and Rensvold (2002), CFI and RMSEA were also

used to test metric and scalar invariance. The cut-off points for rejection of metric and scalar invariance are established as an increase in RMSEA by .015 and a decrease in CFI by .010 (Chen, 2007; Cheung & Rensvold, 2002). If the fit difference between the models falls into the threshold for rejecting the full metric invariance, partial metric invariance could still be explored (Byrne et al., 1989; Millsap & Meredith, 2007), leaving at least two fixed factor loadings in a construct, or in one factor when a construct is composed of by several factors. Once at least partial metric invariance has been established, in order to compare the factor means of the different samples, it is important to explore whether the scores from different groups have the same origin, that is, whether the intercepts across the group are the same (scalar invariance). As for factor loadings, in order to achieve at least partial scalar invariance, the intercepts non-invariance can be explored by relaxing constraints on the intercepts one by one (Byrne et al., 1989; Millsap & Meredith, 2007). Thus, to further support construct validity, the examination of newcomers and full member students' scores on the three subscales of the USQ was carried out through latent means comparison.

Moreover, in order to strengthen the validity of the scale, predictive validity was also tested by examining the relationship between the three USQ subscales at T1 and specific outcomes at T2, weighting the same outcomes at T1.

Results

Longitudinal configural invariance

The longitudinal configural invariance model for the USQ was a three-factor simple structure model in which all items were specified as loading on a single factor corresponding to the occasion in which they were measured. Results presented in Table 3 indicated that the fit of the longitudinal configural invariance model was satisfactory (CFI = .915; RMSEA = .042; $X^2/df = 1.332$), thus the next step was to examine metric invariance. Full metric invariance was not achieved (ΔCFI = .042; ΔRMSEA = .009). As such, partial metric invariance was assessed. Modification indices were inspected to identify the factor loadings to be freely estimated. Several turns of partial metric invariance models, allowing just one factor loading each time to be freely estimated, were tested before achieving a satisfactory partial metric invariance model (ΔCFI = .01; ΔRMSEA = .002). Specifically, all of the factor loadings of the group dimension, except one, were allowed to be freely estimated, whereas for the other two dimensions (organization and task) all the factor loadings were constrained.

Subsequently, full scalar invariance was tested. Although the results pointed out that the threshold for accepting the full scalar model was close, we could not accept the full scalar model (ΔCFI = .012; ΔRMSEA = .003). Thus, according to the modification indices we allowed one intercept in the task dimension to be freely estimated. Finally, the partial scalar invariance was satisfactory (ΔCFI = .01; ΔRMSEA = .002). In sum, measurement invariance was achieved for the task and organization dimensions, whereas it was not possible to accept measurement invariance for the group dimension.

TABLE 3 Fit indices for longitudinal measurement invariance of the USQ

Models	CFI	RMSEA
Configural Invariance	.915	.042
Full metric invariance	.873	.051
Partial metric invariance	.905	.044
Full scalar invariance	.903	.045
Partial scalar invariance	.905	.044

Predictive validity analyses

Results of regression analyses showed a significant and positive relationship between students' academic socialization at T1 and outcome variables at T2. Specifically, significant relationships were found between socialization at the task level (USQ-T) and satisfaction with their study performance ($\beta = .56$; $p < .001$); between students' socialization at the group level (USQ-G) and satisfaction with their peer relationships ($\beta = .41$; $p < .001$); and between students' socialization at the organizational level (USQ-O) and their academic identification ($\beta = .26$; $p < .05$). These findings are consistent with the hypothesized specific contribution of socialization at each level for the different outcomes.

DISCUSSION

This twofold study aimed to propose a specific measure for undergraduates' socialization assessment, capable to capture both context-sensitive features and the transitions students that address in their academic careers. Hence, our study contributes to the literature by addressing relevant issues related to the need of basing socialization research on a reliable measure that reflects the construct expressed in a specific domain (Haueter et al., 2003) and in its development (Vandenberg & Lance, 2000; Widaman et al., 2010). Overall, the findings of both studies supported the USQ three-level dimensionality and construct validity, showing that each socialization subscale contributes to processes at different levels and outcomes. Furthermore, the measurement invariance test showed that partial measurement invariance was achieved. From a methodological point of view, longitudinal measurement invariance testing was necessary for controlling the individual dimensions variance when comparing the structure of the USQ at T1 and T2, thus ensuring that the same underlying construct is assessed when studying and comparing groups of freshmen and tenured undergraduates (Widaman et al., 2010). From a theoretical point of view, the lack of full equivalence at the group-level means that group socialization may change over time. This result opens to several insightful interpretations which should be examined in future research. In fact, during their academic career, undergraduates change their reference groups, selecting progressively more fitting sources of socialization. Hence, during the onboarding experience, students learn and adapt their behaviour to match their position within the group through interactions with other stakeholders who hold normative beliefs (Brimm, 1966; Weidman, 1989).

Overall, the present study provided evidence of the good psychometric properties of the USQ thereby supporting its use for research and practical purposes.

Implications for theory and practice

This paper contributes to the socialization field in several ways. First, to the best of our knowledge, the USQ is an initial attempt to adapt a measure of organizational socialization to higher education context, proposing an instrument devoted to operationalizing and tapping undergraduates' academic socialization, rather than reflecting a proxy of it. Thus, the assessment and theorization of this construct are more precise.

In addition, the present paper responds to the need to ensure that dynamic constructs generalize across groups at different stages of development or across time (Vandenberg & Lance, 2000; Widaman et al., 2010), providing a unique application for testing socialization's longitudinal equivalence and evaluating whether the USQ scale reflects the same construct when changes occur. Thus, our results provide initial empirical support for making meaningful inferences when comparing students at different stages of their academic careers, an essential prerequisite for further analyses and model testing.

From an applied perspective, socialization represents one of the main factors for academic success. Therefore, the USQ may be a useful tool for Higher Education managers interested in fostering students' success and preventing withdrawal, to capture the effectiveness of their University inclusion process and risk of failure, thus limiting costs of non-completion or re-uptake (Withey et al., 2014; Yorke, 1999). Specifically, the USQ's reliability in assessing undergraduates' socialization across different stages of their academic career allows following the students' development from the entry stage to their full membership, until the end of their course of study and the building of their pre-professional identity when entering the workforce.

In particular, the three-level conceptualization of the socialization process (Haueter et al., 2003) allows policymakers the monitoring and planning of specific interventions focused on the weaknesses of each domain. For instance when students are low in task-socialization, interventions such as training on learning methodologies or a different course scheduling may be implemented. When students are low in group-socialization, teaching methodologies may be integrated with team activities, or policies aiming at social inclusion may be promoted. When students are low in organizational-socialization, interventions to strengthen pre-professional identity or to enhance the University's prestige and reputation may be designed.

Overall, policies and interventions to support undergraduates' socialization may be consistently targeted to implement the effectiveness of their adjustment processes or to reduce phenomena such as marginalization and dropout during students' academic career, as well to implement pre-professional socialization (Barretti, 2004; Lindberg, 2009; Weidman, 1989).

Limitations and suggestions for future research

The use of convenience samples is a main limitation of the study. Particularly, Study One adopted a snowball approach that does not allow controlling the representativeness of the sample. Although our participants showed variety in gender and type of bachelor's degree, future research on specific populations could help to further validate the USQ. In the present study, the homogeneity of the context (as in Study Two, comparing students pursuing the same kind of degree) facilitated the understanding of the socialization process. Yet, a fruitful direction for further research could be to examine academic socialization across groups of students, different in the type of course or personal characteristics, for instance those who may be disadvantaged by an awarding gap (typically students of colour and those from socio-economically disadvantaged backgrounds; Larose et al., 2019; Padgett et al., 2010). Future studies could also provide further support for our results by replicating findings in different academic contexts or countries – hence taking into account possible differences in mission, implicit norms, values or local cultures (Barbaranelli et al., 2018; McCabe & Trevino, 2017) – thereby contributing to generalizability.

Furthermore, the USQ should be adopted in studies integrating the socialization process in a model with other variables. For instance the assessment of future employability could help to understand the role of socialization not only within an individual's academic career but also across their work life.

CONFLICTS OF INTEREST

All authors declare no conflict of interest.

AUTHOR CONTRIBUTION

Maria Luisa Farnese: Conceptualization; Data curation; Methodology; Project administration; Writing – original draft; Writing – review & editing. **Paola Spagnoli:** Formal analysis; Methodology; Writing – original draft. **Stefano Livi:** Conceptualization; Writing – original draft.

DATA AVAILABILITY STATEMENT

Data are available on request from the authors.

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