

Specialization as a Personality Trait and Tendency: Introducing an Instrument of Measuring the Specialization Degree: Part 2

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Abstract

The debate over the benefits and cons of specialization is one of the most interesting ongoing subjects with compelling arguments on both sides. The current study's scope is to take a step ahead toward analyzing specialization as a dynamic variable. Moreover, we aim at introducing and evaluating a means to measure the degree of specialization a person manifests in their daily life. By establishing a method of quantifying it, we purpose in future research on potential interrelation between specialization and various personality aspects (such as introversion and extroversion, proclivity towards cooperation, adjusting in changes, etc.). In view of that, we introduced a measurement tool, the Specialization Questionnaire (S.Q.), which we administered in a population of 272. The results indicated that the participants consider job specialization to be of significant importance for work advancement, but not necessarily as a fundamental criterion for forming social interactions. Additionally, it has been partially showed that the higher the specialization tendency, the higher the seeking for specialized stimuli in free time. There is more research required to that direction, in order to establish a theoretical model with a high predicting degree.

Keywords

Specialization Questionnaire, Measurement, Personality, Specialization, Diversification, Trait, Profession

1. Introduction

1.1. Definition and Aspects of Specialization

Specialization constitutes a term used in many areas of human activity and at

the same time includes a variety of etymology approaches, depended on the framework (Vrachas & Leontakianakos, 2015). Various definitions have been proposed by different sources for the description, or the distinction, of different facets or functions of the specialization phenomenon (Vrachas & Leontakianakos, 2015). Indicatively, in bibliography appear the partial terms *sectoral specialization*, for describing the production's focus on certain sectors, and *functional specialization* respectively, which concentrates on the analysis of management and services (Duranton & Puga, 2005). Additionally, the concept of *specialization effect* is mentioned (where the strict distinction of competence/activity replaces the soft skills of the working stuff) (Bacolod et al., 2009).

One more contradictory pair of terms is *specialization* as opposed to *diversification* (Folinas & Altharwa, 2012). The term *static specialization* also appears in international literature (the focusing of a company to what already knows well to do) as an antipode to the term *dynamic specialization* (Hagel III & Brown, 2005). Another term is *specialization by firm*, utilized to describe the variety of different services and goods a certain company offers or produces (Kalra & Li, 2008). In Stevenson (2005)'s analysis on Wolfgang Mewes' work, the terms *horizontal specialization* and *vertical specialization* are pitted against each other. Other definitions are: the *long-run specialization* in Ono & Shibata (2006), the *endogenous specialization* (Sun et al., 1999; Yang & Yeh, 2002; Batchimeg, 2022), *specialization by a firm*, in which a firm "markets a narrow number of services" only (Kalra & Li, 2008), and *functional specialization* (Shepard, 1969; Cascio, 1974).

Wide and systematic use of the term is taking place especially in the framework of two main scientific fields, Biology (Rogers, 2000; Hjältén & Hallgren, 2002; Marsico et al., 2010; Carter & Clutton-Brock, 2014) and Financial Studies in general (where the field of Business Administration is included). As far as the former is concerned, a noticeable use of the term pertains to the type of food-seeking strategy the animals follow. More specifically, there are the generalists, which go for (almost) anything they can find and biochemically and physiologically process. And there are the specialists, which are "pickier" with their alimentary choices (Mayer, 2001; Begon et al., 2014; Chintiroglou & Staikou, 2020).

Specialization is also related to studies regarding the relation between the environment and the population size (Millimet & Slottje, 2003; Ruffin, 2009). An equal entanglement with the parameters of specialization and the intricate nexus of personality aspects has yet to occur within the broader field of Psychology. Though the study of animals' behavioral patterns is a common ground for both the fields of Biology and Psychology, there can be differences in the method of testing the questions regarding their adaptation tactics, part of which is also specialization (Krause, 2015). The initiative and originality of those studies (some noticeable cases: (Anastasi, 1967; Little, 1972; Sales, 1985; Shin & Zhou, 2007;

Moghaddam, 1989), although casting a preliminary light on the correlation between the working specialization and various personality or cognitive aspects, openly contradicts the scarcity in research data.

1.2. Arguments in Favor and against Specialization

The economic and administrative fields are prominent in the analysis of the potential advantages either of specialization or diversification. Arguments have been phrased both by those in favor of specialization, as well as by those who support diversification. Thus, debating against specialization Hagel III & Brown (2005) states that specialization leads to stagnation or even to the shrinking of a company which adopt this approach. However, it is not clarified in which exact way specialization negatively impacts the financial and administrative course of a company. A typical point for generalism is that the corporations adopting a specialized policy, are prone to fluctuations and alterations of the economic environment: “*If my company specializes in one area, then what happens if something disrupts the marketplace and renders my specialization worthless* (Hagel III & Brown, 2005)?”

Another aspect of the conflict is being brought forth in favor of the general function by Baumann et al. (2011). Furthermore, a study (Black et al., 2004) focuses on the positive aspects of multi-skilling, according to which the employees who respond to multi-tasking are awarded with higher commissions than their colleagues who are specialized in a certain area. To that extent, Jacobs (1969) in his book defends general abilities and activities, since “playing” on more fields contributes in forming a state of readiness towards innovations and co-operation among different fields and sectors. Glaeser et al. (1992) asseverate that is regional diversification and not regional specialization respectively that, as far as the cities of U.S.A. are concerned, has a positive effect on employment growth. To that direction, Feldman & Audretsch (1999) claim that innovation is facilitated from industrial diversification rather than specialization. Nobel laureate Simon Kuznets in his Nobel Prize lecture notes that “[a] country’s economic growth may be defined as a long-term rise in capacity to supply increasingly diverse economic goods to its population [...] (Kaulich, 2012).”

Moreover, minimizing the risk of focusing on a single commercial activity is a core argument in the economic based literature (Porter, 1985): Schilling & Steensma (2001) advocate in favor of “loosely coupled organizational forms”, Ritter, Wilkinson, & Johnston (2004) in favor of an open, networked firm, while in other studies the same matter is addressed through a variety of terms, such as *dyadic business relationships* (Anderson et al., 1994), *governance of interorganizational links* (Jones et al., 1997), *network organizations* (Miles & Snow, 1986, 1992; Jones et al. 1997; Achrol, 1997), *virtual organizations* (Chubbuck & Young, 1992; Davidow & Malone, 1992; Chesbrough & Teece, 1996), *modular organizations* (Sanchez, 1995; Lei et al., 1996). Diversified economies

retain another crucial advantage, according to some economists: they demonstrate a higher level of flexibility in cases of economic shocks and fluctuations in terms of global trading, thus being less likely to sustain a big hit on their exportation ratio (Grossman & Helpman, 1992; Osakwe, 2007; Hesse, 2008).

On the field of sociology and political theory, the negative effects of specializing knowledge within the framework of policy-making are noticeable. For Turner (2003), the main problem that a liberal democracy faces, relates with the ad hoc inability of the common citizens to figure out exactly when those experts surpass the limits of their knowledge. A step ahead, specialization is the privilege of the few: *“To the extent that we recognize expertise as real, we acknowledge an inequality. To fail to recognize expertise is to accept a fiction, and to base politics on a fiction. The inequality cannot be eliminated except in fiction. The effects of expertise in these cases are political in the most familiar of senses. They involve the exercise of state power. Here the inequality has tangible consequences for the ‘discussion’ that are the basis of liberalism”* (Turner, 2003). As Burton (1975) suggests: *“New ideas in research come from asking ourselves simple, often quite naive questions. The more ‘expert’ we become in a narrow field of knowledge, the less likely we are to be willing to ask such questions, not only in other fields, but particularly in our specialized field. The diffidence of the ‘professional’ is natural, since asking a ‘stupid question’ might suggest that, with all his detailed knowledge, he lacks a grasp of fundamental principles* (Burton, 1975).”

At the opposite end of the spectrum, in order to support the benefits of specialization, its proponents interconnect specialized services with quality. More specifically, it is suggested that focusing on a limited area of producing goods or providing services results in increasing their quality (Bloch, 1995). According to the Green Sheet Online (2007), *“As the merchant services industry becomes more competitive, ISOs and agents have a true competitive advantage if they are a specialist or expert in a particular vertical niche...”* Extending this premise, it is claimed that the performance of those employees utilized in various and diverse duties, may as well be low and limited, since they are not trained in a specific task. In plainer words, specialization is about focusing on these tasks in which an industry performs best (Folinas & Altharwa, 2012).

An extra argument intending to highlight the benefits of specialization underlines its comparative advantage: higher efficiency and mutual welfare (Kaulich, 2015). The skepticism over the selection of diversification over specialization (especially in effort-intensive industries) is overtly expressed by Kalra & Li (2008). Up voting the pros of specialization, she states: *“Specialization is therefore more likely to indicate quality when consumers can easily observe different firms using multiple strategies—that is, some firms specialize, whereas other do not”*. To that direction, it's regional specialization, instead of diversification, that facilitates the innovation (Anderson et al., 1994; Fritsch & Slavtchev, 2009). A number of searches are advocating in favor of lower costs in those working fields

that the human capital is at the epicenter of the effort (Farely & Hogan, 1990; Adams, 1997; Easthaugh, 2001). Finally, Gompers et al. (2009) conclude that as far as the venture investment is concerned “*the performance of specialized firms appears to be better in general*”.

The strict, polarized antithesis aside, bibliography stresses the difficulty of advocating for one over the other, at least as far as the financial-industrial field is concerned. At the end of the day, much is depended upon various factors and conditions (Markides & Williamson, 1996; Kalra & Li, 2008; Bartkus & Hassan, 2009, Kaulich, 2015). Still, an economic model introduced in 2003, suggests that neither diversification nor specialization is wrong, or the only approach whatsoever. More specifically, Imbs & Wacziarg (2003) introduced the model of the non-linear relationship, according to which the typical course of an economic entity (enterprise, industry, company, national economy, etc.) demonstrates a U-curve. Namely, it begins with specialization, it turns to diversification and at some point, it goes back to the initial approach of specialization.

Regarding the psychological field *per se* there are numerous works, which referred to the specialization phenomenon merely as a neutral term, signifying a fragmentation of the area into sub-fields and viewed predominantly through the lenses of description (Kelly & Goldberg, 1959; Matarazzo, 1987; Mos, 1990; Stam, 1990; Bower, 1993; Drum & Blom, 2001; Rodolfa et al., 2005; Lawless & Kulikowich, 2006; Kaslow et al., 2012; Neimeyer et al., 2014). The psychological bibliography it seems to be predominantly concerned with defining the precise subject and limits of the scientific field, rather than shading light on the nature, aspects and outcomes of specialization in relation to the human cognitive, behavioral or interpersonal facets. To that extent, there are numerous articles that reflect the effort to alleviate the uncertainty over the exact premises of each partial subdomain within the main domain. An uncertainty that would put in question the status of the field itself, while the scope is to equalize it with the medical science (Kriedt, 1949; Bass, 1950; Adkins et al., 1954; Thorndike, 1954, Robiner et al., 2012; Baker & Cox., 2014).

Attempts have been oriented to the direction of investigating the factors that cause psychologists to specialize and more specifically in relation to personality features or academic interests (Bass, 1950; Thorndike, 1955; Howell & Newman, 1963). Baker & Cox (2014) summate the arguments in favour of specialization by invoking the need for organizing the increasingly accumulated knowledge in a systematic manner among the miscellaneous subfields (making use of rather strong verbs, such as *impel*, *leaves no alternative*, *protecting the public from charlatans*). Moghaddam (1989), on the other hand, shows a different model of exercising psychology, where the *wholistic* perception of approach is used as an answer to the fragmentation of the psychological science into partial specialized sectors. Moreover, in the research field, concerns were expressed already from the middle of the 20th century, according to which the

increasing specialization on the methods of construction and administering psychological tests is leading to a problematic “confidentiality”, “communication of the test results”, communication of the “item form and test content”, to a “rigidity of test-based classification”, to adapting “a narrow conception of ability”, etc. (Anastasi, 1967).

In a highly interesting attempt of interrelating specialization with the research on the personality field, Brian Little introduces the notion of the “man as specialist”, bringing forth and designating the concept of *psychospecialization*. Accordingly, little distinguishes between specialization towards things and towards other persons respectively and through this distinction four diversifying categories emerge: *thing-specialist*, *person-specialist*, *generalist* (presenting a high degree on both categories), *non-specialist* (low degree on both categories).

1.3. Personality Traits

Most of the times, when we talk and write about it, we tend to omit the very concept of personality. What is personality, though? According to the APA Dictionary of Psychology (<https://dictionary.apa.org/personality>, Last visited 08/03/2024), personality is “*the enduring configuration of characteristics and behavior that comprises an individual’s unique adjustment to life, including major traits, interests, drives, values, self-concept, abilities, and emotional patterns...*” Additionally, Kernberg (2016) conceptualizes personality as “*...the dynamic integration of the totality of a person’s subjective experience and behavior patterns, including both conscious, concrete, and habitual behaviors, experiences of self and of the surrounding world, conscious, explicit psychic thinking, and habitual desires and fears and unconscious behavior patterns, experiences and views, and intentional states.*” The stable or fluent nature of the personality facets has also been investigated via the fundamental question as to whether the partial traits are subjected to volitional change (Hudson & Fraley, 2015).

Several theories developed across the timeline of the second half of the 20th century, seeking to formulate a model of well-defined and at the same time measurable traits. According to the most prevalent personality theory today, there are 5 distinctive dimensions: extroversion (namely sociability, confidence, taking action), agreeableness (entailing attributes such as kindness, availability to cooperation, being sympathetic), conscientiousness (organization skills, result-focusing, punctuality, persistency, planning through), openness to experience (facets of which are creativity, investigative inclination, flexibility to new ideas) and neuroticism (encompasses traits such as anxiety, irritability) (McCrae & Costa, 2004; Sultan et al., 2023). Eysenck (1992), considering that three of the Big Five model’s factors overlap each other (agreeableness, conscientiousness and openness to experience), he argued in favor of a three-factor model instead. There is also the six factors theory (HEXACO model) of De Vries et al. (2009): honesty-humility, emotionality, extraversion, agreeableness, conscientiousness

and openness to experience.

There is an extensive bibliography concerning the effort to diagnose the personality type link to various cognitive and cultural aspects, as well as academic and professional specialization (Staudinger et al., 1992; Paunonen & Ashton, 1998; McCrae & Terracciano, 2005; Sigmund et al., 2013; Fischer & Boer, 2014; Damian et al., 2015; Al-Samarraie et al., 2017; Woods et al., 2018; Guilera et al., 2019; Şahin et al., 2019). On the other hand, the amount of data concerning the relation between cognitive specialization and extra-working activities is rather limited. The same applies for personality traits. Randler et al. (2023) searched the string that links the personality type and the form of recreation an individual goes for. The results showed that certain personality facets (extraversion, agreeableness, openness, emotional stability, conscientiousness) are related to higher levels of satisfaction in life. This may not sound as new, since extra overtness is well known to be linked to a more positive view of things. What is quite interesting, though, is the findings signaled towards higher satisfaction from life via recreational specialization. All the while, the higher the degree of specialization, the lower the appetite for taking on new habits and experiences. As Randler et al. put it: “*the development of a leisure career may lead to a higher mastery level, but probably on the costs of losing interest in other activities.*”

2. Main Discussion

2.1. Purpose of the Current Study

With this study we aimed at meeting a three-facet target. Firstly, to establish specialization as a quantifiable rather than a vague qualitative trait, which can be measured and subjected to fluctuations in relation to other variables. In view of that, we set the second objective, which is to introduce and evaluate the validity of the Specialization Questionnaire, as a means to measure the degree of specialization a person manifests in their daily life. Last but not least, to trace any relation between working specialization and the degree of the person's involvement into various activities, social, intellectual, artistic. In other words, the proclivity is pursuing and taking up new stimuli. Those scopes aside, by aiming exactly at establishing a method of measuring an attribute, we move a step closer in interrelating specialization with personality aspects (such as introversion and extroversion, proclivity towards cooperation, adjusting in changes, etc.), which can be the main objective of future research.

2.2. Sample

The sample consisted of 272 participants, all adults between 18 - 65 years old. No exclusion criterion regarding their work and unemployment status has been set. There were 123 male and 148 female participants, with the majority to be Greek employees of private sector with medium salary and level of edu-

cation, ranging from bachelor to MSc degree. The S.Q. has been administered in people from both urban and rural areas of Greece, in pursuit of a wider representation not only in terms of profession, but also of mentality and perception among people of dissimilar societal context even within the same professional field.

2.3. Administration

The sample selection followed a double path: random and randomly selective. In the former case, we focused on the en-masse approach. Namely, we wrote down a certain number of private companies and public administration services, we randomly picked up 10 of them based on three distinctive geographical parts of Greece (Athens, Thessaloniki, Serres). We came in contact, explaining the research scope and underlying the anonymity parameter and distributed the enclosed Questionnaires among the employers. We set the maximum temporal limit for getting them back to 7 days. In the latter approach, we administered the S.Q. in classes of secondary education from three different schools of varying socio-economic and geographical areas of Athens. More specifically, we approached the school principals explaining in detail the reasoning of the study, underlining its significance. After the permission was granted, we were allowed to inform the parents during the semester's student performance meeting. Via the introductory letter, we provided the following explanatory excerpt: "The Questionnaire attached with the current note is designed and administered for the purpose of searching the relation between the professional field and the off-work interests and activities".

2.4. Method

The main goal of this study is to present a tool that can provide with quantifiable results in relation to how people perceive specialization, as well as to how the degree of work specialization is correlated to social-interpersonal relations and personal-free time. For that reason, we administered the Specialization Questionnaire to 272 participants. The questionnaire (S.Q.) is divided in three parts. The demographics part, where general information about the age, gender, ethnicity, academic level, financial level, and professional sector of the participants are included. The second part consists of 32 questions of closed-ended type, with for graded responses (1 = No; 2 = Probably no; 3 = Probably yes; 4 = Yes). The third part contains a definition of specialization question, with 5 different already given responses for the questionee to choose from. The second and main part of the S.Q. encompasses three main categories: 1) The personal/free time; 2) The professional activity; 3) The social/interpersonal relations.

Table 1 and **Figures 1-6** present the demographic data of the sample which consists of 272 respondents.

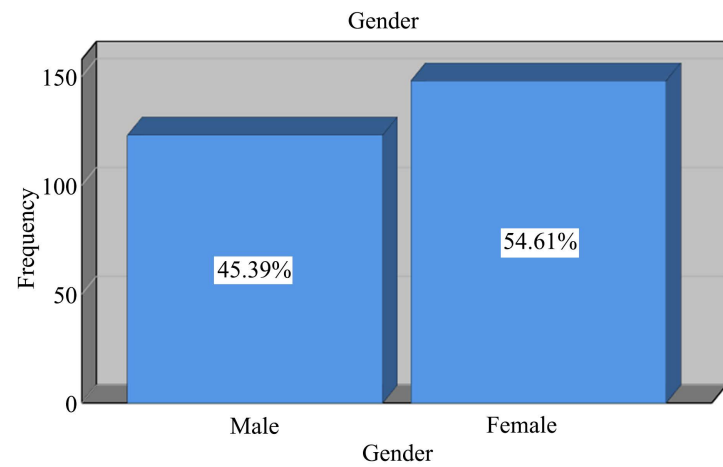


Figure 1. Gender. Concerning the gender of participants 54.61% ($N = 148$) are females and 45.39% ($N = 123$) are males.

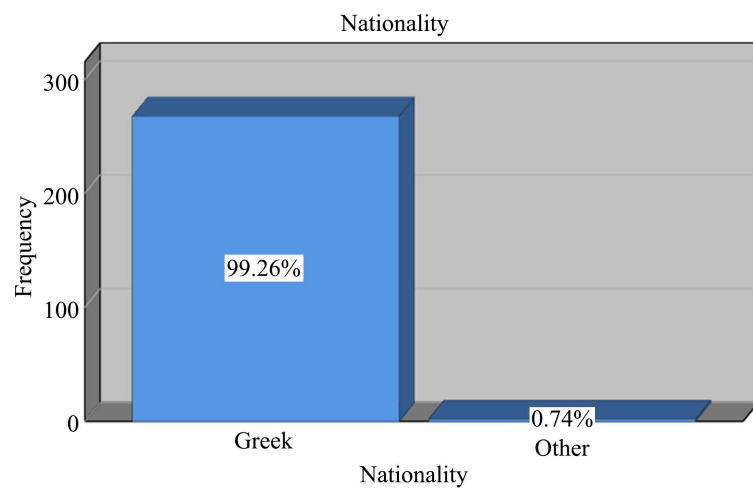


Figure 2. Nationality. Regarding the nationality, the vast majority of participants 99.26% ($N = 268$) are Greeks, while 0.74% ($N = 2$) have another nationality.

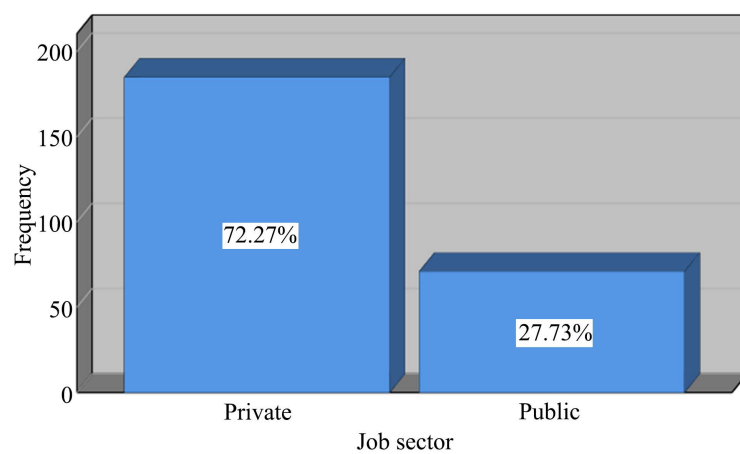


Figure 3. Job sector. Concerning the job sector 72.27% ($N = 185$) work in private sector and 27.73% ($N = 71$) in public.

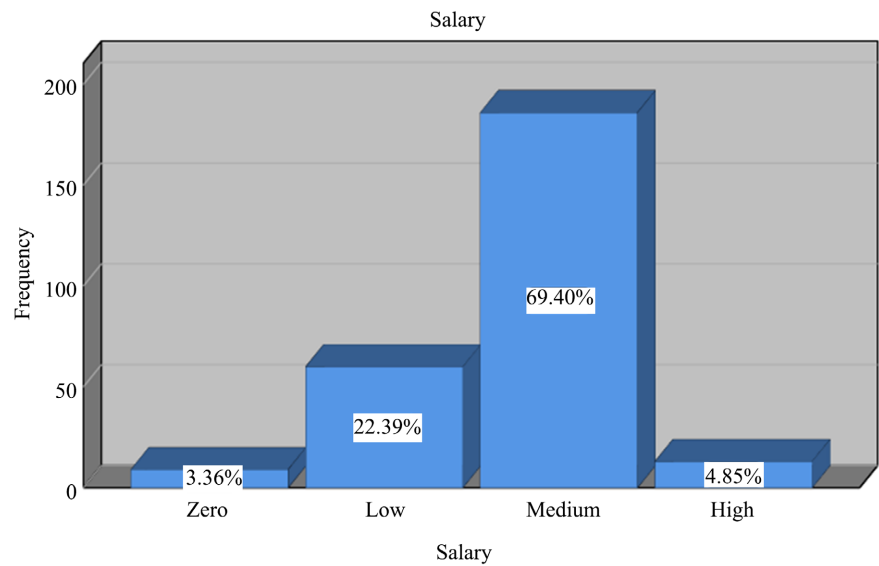


Figure 4. Salary. As far as salary is concerned, the 69.40% ($N = 186$) earn medium salary, the 22.39% ($N = 60$) low, the 4.85% ($N = 13$) high and 3.36% ($N = 9$) earn zero salary.

Table 1. Demographics.

Nominal variable	Categories	<i>N</i>	%
Gender	Male	123	45.39%
	Female	148	54.61%
Nationality	Greek	268	99.26%
	Other	2	0.74%
Job sector	Private	185	72.27%
	Public	71	27.73%
Salary	Zero	9	3.36%
	Low	60	22.39%
	Medium	186	69.40%
	High	13	4.85%
Level of education	Primary	7	2.60%
	High school	44	16.36%
	Technological	40	14.87%
	Bachelor	117	43.49%
	MSc	51	18.96%
	PhD	10	3.72%
Scale variable	<i>M</i>	SD	Range
Age	41.80	9.54	21 - 70

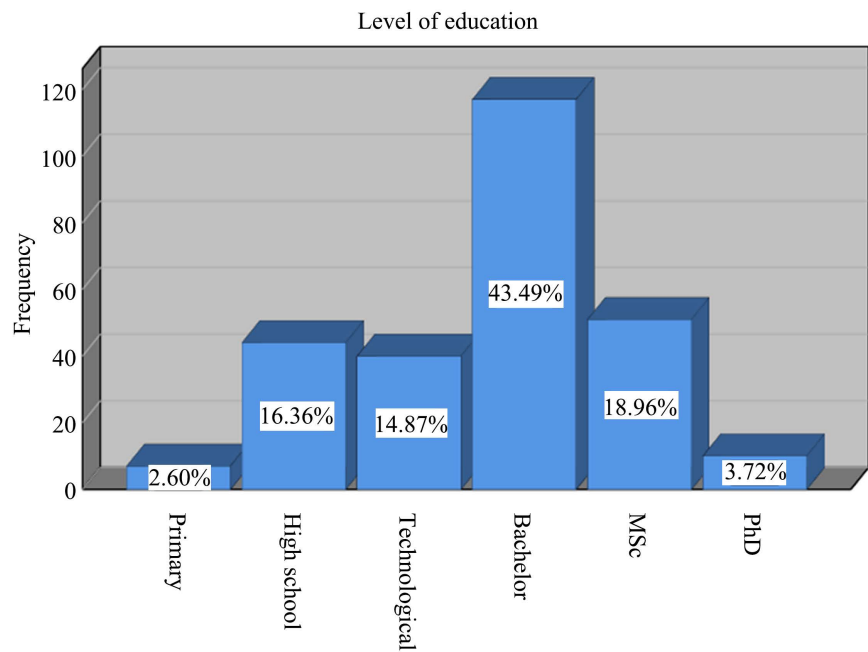


Figure 5. Level of education. Regarding the level of education 43.49% ($N = 117$) of the participants have the bachelor degree, the 18.96% ($N = 51$) MSc, the 16.36% ($N = 44$) are high school graduates, the 14.87% ($N = 40$) have technological education, the 3.72% ($N = 10$) are PhD holders and 2.60% ($N = 7$) have primary education level.

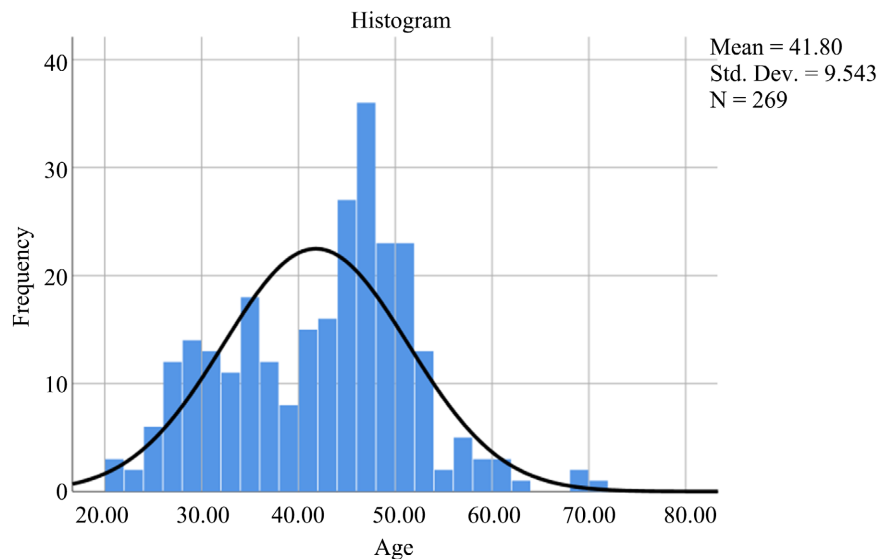


Figure 6. Age. In terms of age, the respondents are on average 42 years ($M = 41.80$, $SD = 9.54$) old with the range to be from 21 to 70 years.

3. Demographics

3.1. Social-Interpersonal Relations

The concept of specialization in their social-interpersonal relations, the participants are socializing in a personal level with individuals that are not related to their professional field (92.65%, $M = 3.66$), they also find this interaction to be

interesting (92.22%, $M = 3.57$). The majority of responders believe that interacting with people from different fields of activity/profession contributes to the social evolvement and rising (83.45%, $M = 3.20$), while the interaction with individuals who are active in the same professional field contributes to the up growth and improvement to that field (72.43%, $M = 2.87$). Furthermore, the responders don't believe that interacting with individuals from the same field of profession/activity entails more pros in relation to interacting with individuals from different field of profession/activity (62.73%, $M = 2.15$), that the person who possesses specialized knowledge in a specific field of activity/work can more effectively solve the problems that occur in its personal relations (72.33%, $M = 2.01$) and that the conversations among the persons they choose to relate with don't concern the object of their activity/profession (74.26%, $M = 1.89$) (Table 2, Figure 7).

Table 2. Social interpersonal relations.

Questions	Range	<i>M</i>	<i>SD</i>	No	Maybe No	Maybe Yes	Yes
14. In a personal level are you socializing with individuals that are not related to your professional field?	1 - 4	3.66	0.71	3.31%	4.04%	16.18%	76.47%
18. Do you find the interaction with persons who are not related to your professional field to be interesting?	1 - 4	3.57	0.75	4.07%	3.70%	23.70%	68.52%
11. Do you believe that interacting with people from different fields of activity/profession contributes to the social evolvement and rising?	1 - 4	3.20	0.81	4.04%	12.50%	43.01%	40.44%
25. Do you believe that the interaction with individuals who are active in the same professional field as yours contributes to the up growth and improvement to that field?	1 - 4	2.87	0.91	10.66%	16.91%	47.43%	25.00%
8. Your personal/social interactions include persons from your professional field?	1 - 4	2.65	1.18	25.37%	16.54%	25.74%	32.35%
27. Do you form relations which could be potentially proven useful on your professional field?	1 - 4	2.60	1.11	22.79%	20.96%	29.41%	26.84%
5. Do you believe that interacting with individuals from the same field as yours contributes to the social up growth and professional ascent?	1 - 4	2.52	0.97	19.56%	23.62%	41.70%	15.13%
1. Do you prefer to select the persons with whom you relate according to defined and common among those persons characteristics?	1 - 4	2.40	1.00	23.33%	27.41%	35.19%	14.07%
17. Do you believe that interacting with individuals from the same field of profession/activity entails more advantages in relation to interacting with individuals from different field of profession/activity?	1 - 4	2.15	0.95	29.89%	32.84%	29.15%	8.12%
4. Do you believe that the person who possesses specialized knowledge in a specific field of activity/work can more effectively solve the problems that occur in its personal relations?	1 - 4	2.01	0.99	37.64%	34.69%	16.61%	11.07%
19. The conversations among the persons you choose to relate with concern the object of your activity/profession?	1 - 4	1.89	0.93	43.01%	31.25%	19.49%	6.25%

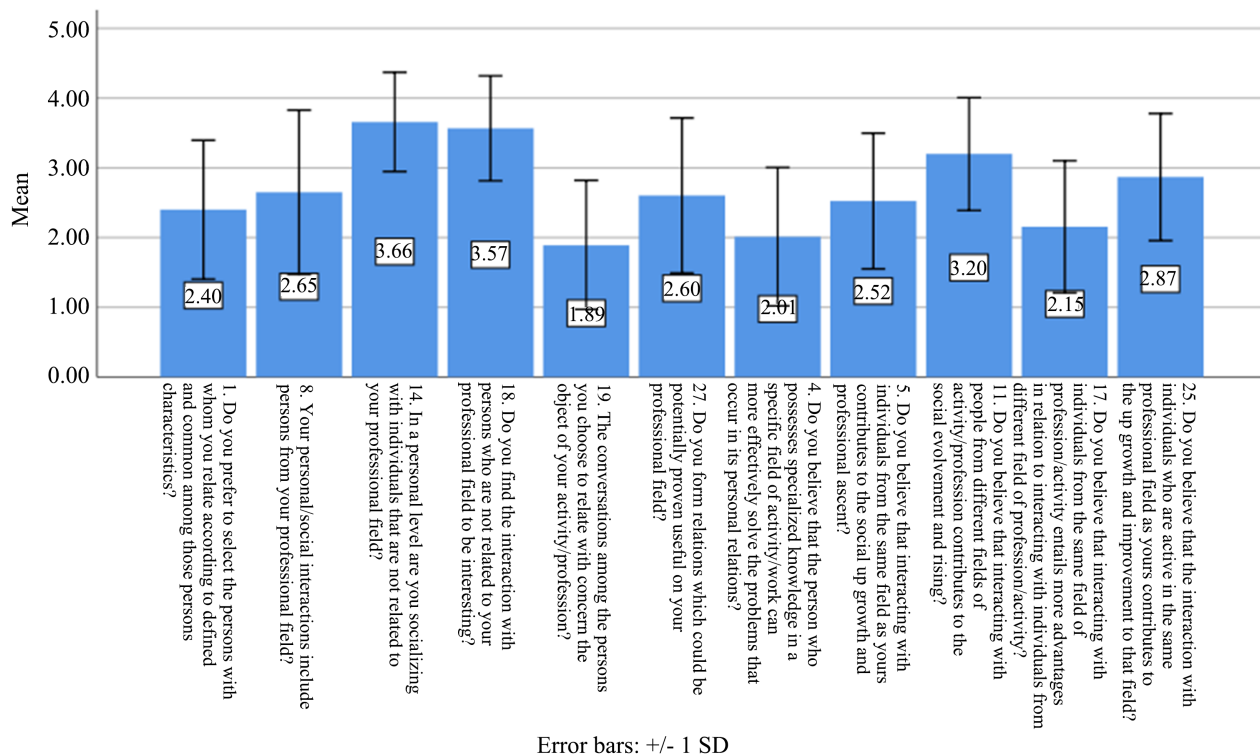


Figure 7. Social-interpersonal relations.

3.2. Personal-Free Time

As far as the concept of specialization in their personal-free time is concerned, the responders believe that the person could demonstrate equally high levels of performance in multiple fields of activity (88.24%, $M = 3.31$), that they choose to study cognitive/professional fields different from that of their profession (63.61%, $M = 2.90$), and that the content of the studies and the content of the profession should be identified (66.79%, $M = 2.87$). In addition, responders don't believe that the capacity to specialize in certain field entails an increased level of intelligence (65.81%, $M = 2.14$), they don't choose to occupy themselves with the subject of their activity/profession during their personal/free time as well (65.31%, $M = 2.05$) and with relevant activities (73.71%, $M = 1.88$) (Table 3, Figure 8).

3.3. Professional Activity

As referred to the concept of specialization, regarding professional activity, the vast majority of participants think that specializing in a specific field is necessary in order for the person to improve its performance (92.22%, $M = 3.42$) and they are informed of printed or electronic form for the developments on their field of activity/profession (83.46%, $M = 3.29$). In addition, they are aiming at excelling in their area of activity/work (76.21%, $M = 3.07$), they think that specializing in a specific field is related to higher financial incentives (80.07%, $M = 3.07$) and to more facile professional prospects (79.71%, $M = 3.07$). Furthermore, they consider

it important for a professional to be specialized exclusively in a specific field (71.59%, $M = 2.93$), that it is necessary in order to achieve professional success (70.22%, $M = 2.92$) and that specialization facilitates a better achievement of the goals the person sets (63.10%, $M = 2.66$). However, most of participants aren't obliged to be involved with things related to their activity/profession in their personal/free time (61.39%, $M = 2.13$) (Table 4, Figure 9).

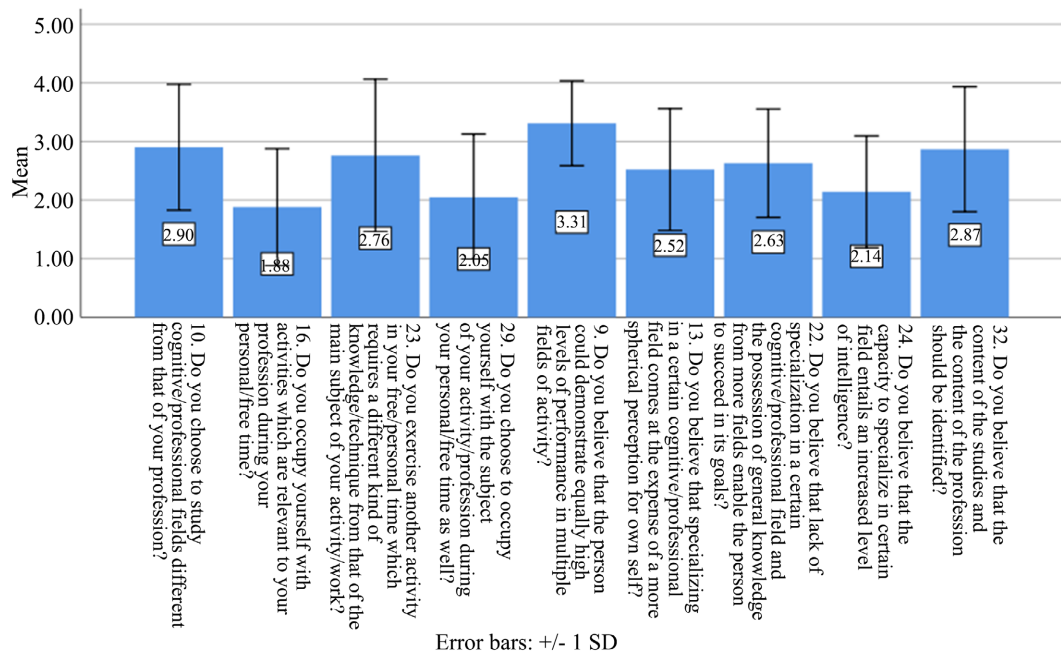


Figure 8. Personal-free time.

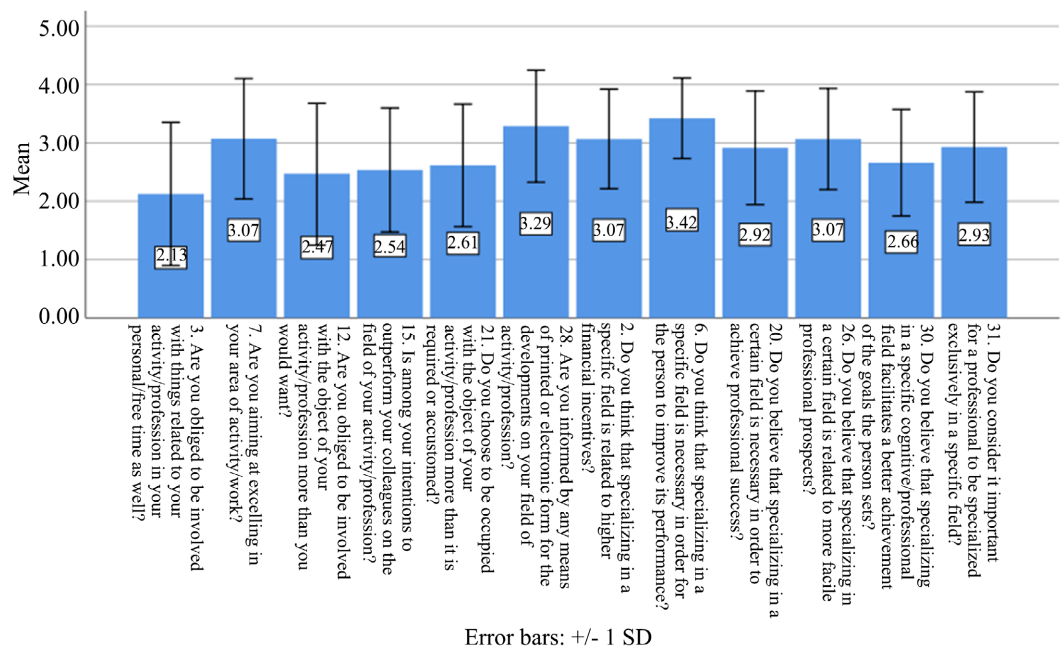


Figure 9. Professional activity.

Table 3. Personal-free time.

Questions	Range	<i>M</i>	<i>SD</i>	No	Maybe No	Maybe Yes	Yes
9. Do you believe that the person could demonstrate equally high levels of performance in multiple fields of activity?	1 - 4	3.31	0.72	1.84%	9.93%	43.75%	44.49%
10. Do you choose to study cognitive/professional fields different from that of your profession?	1 - 4	2.90	1.07	13.24%	23.16%	23.90%	39.71%
32. Do you believe that the content of the studies and the content of the profession should be identified?	1 - 4	2.87	1.07	15.50%	17.71%	31.37%	35.42%
23. Do you exercise another activity in your free/personal time which requires a different kind of knowledge/technique from that of the main subject of your activity/work?	1 - 4	2.76	1.30	29.52%	10.70%	14.02%	45.76%
22. Do you believe that lack of specialization in a certain cognitive/professional field and the possession of general knowledge from more fields enable the person to succeed in its goals?	1 - 4	2.63	0.92	12.13%	31.62%	37.50%	18.75%
13. Do you believe that specializing in a certain cognitive/professional field comes at the expense of a more spherical perception for own self?	1 - 4	2.52	1.04	21.03%	26.20%	32.47%	20.30%
24. Do you believe that the capacity to specialize in certain field entails an increased level of intelligence?	1 - 4	2.14	0.95	29.78%	36.03%	24.63%	9.56%
29. Do you choose to occupy yourself with the subject of your activity/profession during your personal/free time as well?	1 - 4	2.05	1.08	42.80%	22.51%	21.77%	12.92%
16. Do you occupy yourself with activities which are relevant to your profession during your personal/free time?	1 - 4	1.88	0.99	47.04%	26.67%	17.41%	8.89%

Table 4. Professional activity.

Questions	Range	<i>M</i>	<i>SD</i>	No	Maybe No	Maybe Yes	Yes
6. Do you think that specializing in a specific field is necessary in order for the person to improve its performance?	1 - 4	3.42	0.69	1.85%	5.93%	40.37%	51.85%
28. Are you informed by any means of printed or electronic form for the developments on your field of activity/profession?	1 - 4	3.29	0.96	9.56%	6.99%	28.68%	54.78%
7. Are you aiming at excelling in your area of activity/work?	1 - 4	3.07	1.03	13.01%	10.78%	32.34%	43.87%
2. Do you think that specializing in a specific field is related to higher financial incentives?	1 - 4	3.07	0.85	6.64%	13.28%	46.86%	33.21%
26. Do you believe that specializing in a certain field is related to more facile professional prospects?	1 - 4	3.07	0.87	7.01%	13.28%	45.76%	33.95%

Continued

31. Do you consider it important for a professional to be specialized exclusively in a specific field?	1 - 4	2.93	0.95	9.96%	18.45%	40.22%	31.37%
20. Do you believe that specializing in a certain field is necessary in order to achieve professional success?	1 - 4	2.92	0.97	11.03%	18.75%	37.87%	32.35%
30. Do you believe that specializing in a specific cognitive/professional field facilitates a better achievement of the goals the person sets?	1 - 4	2.66	0.91	13.65%	23.25%	46.49%	16.61%
21. Do you choose to be occupied with the object of your activity/profession more than it is required or accustomed?	1 - 4	2.61	1.05	18.01%	27.57%	29.41%	25.00%
15. Is among your intentions to outperform your colleagues on the field of your activity/profession?	1 - 4	2.54	1.06	21.77%	25.09%	31.00%	22.14%
12. Are you obliged to be involved with the object of your activity/profession more than you would want?	1 - 4	2.47	1.21	31.62%	18.38%	21.32%	28.68%
3. Are you obliged to be involved with things related to your activity/profession in your personal/free time as well?	1 - 4	2.13	1.23	47.79%	13.60%	16.91%	21.69%

3.4. Definition of Specialization

The 34.21% ($N = 91$) believe that specialization is the limited in width yet extended in depth function in a specific field via assimilating specific data, the 31.95% ($N = 85$) believe the perfection in a specific field through the improvement of the data quality and the 30.83% ($N = 82$) stated the effective function in a specific field through the improvement of the data quality. Only 2.26% ($N = 6$) stated that specialization is the one-dimensional function in a specific field through focusing on deficient data and the 0.75% ($N = 2$) the one-dimensional function in a specific field through focusing on deficient data (**Table 5, Figure 10**).

4. Inferential Statistics**4.1. Reliability Analysis**

Reliability was satisfactory for factor “personal-free time” ($\alpha = 0.744$) while moderate for “social-interpersonal relations” ($\alpha = 0.619$) and “professional activity” ($\alpha = 0.607$) (**Table 6**).

4.2. Test of Normality

According to **Table 7**, normality was accepted only for factor “professional activity” ($p = 0.234 > 0.05$).

4.3. Correlation between Factors

Table 8 indicates that factors are positive correlated at significance 1% in any case.

Table 5. Definition of specialization.

Specialization is...	<i>N</i>	%
The perfection in a specific field through the improvement of the data quality	85	31.95%
The effective function in a specific field through the improvement of the data quality	82	30.83%
The limited in width yet extended in depth function in a specific field via assimilating specific data	91	34.21%
The one-dimensional function in a specific field through focusing on deficient data	6	2.26%
The field-limited function via focusing on a limited range of data	2	0.75%

Table 6. Reliability analysis.

Factor	Items	Item Loading	Cronbach's α	Reliability
Social-interpersonal relations	1, 4, 5, 8, 17, 19, 25, 27	[0.157. 0.429]	0.619	Moderate
Personal-free time	16, 29	0.594	0.744	Satisfactory
Professional activity	2, 3, 6, 7, 12, 15, 20, 21, 26, 28, 30, 31	[0.143. 0.386]	0.607	Moderate

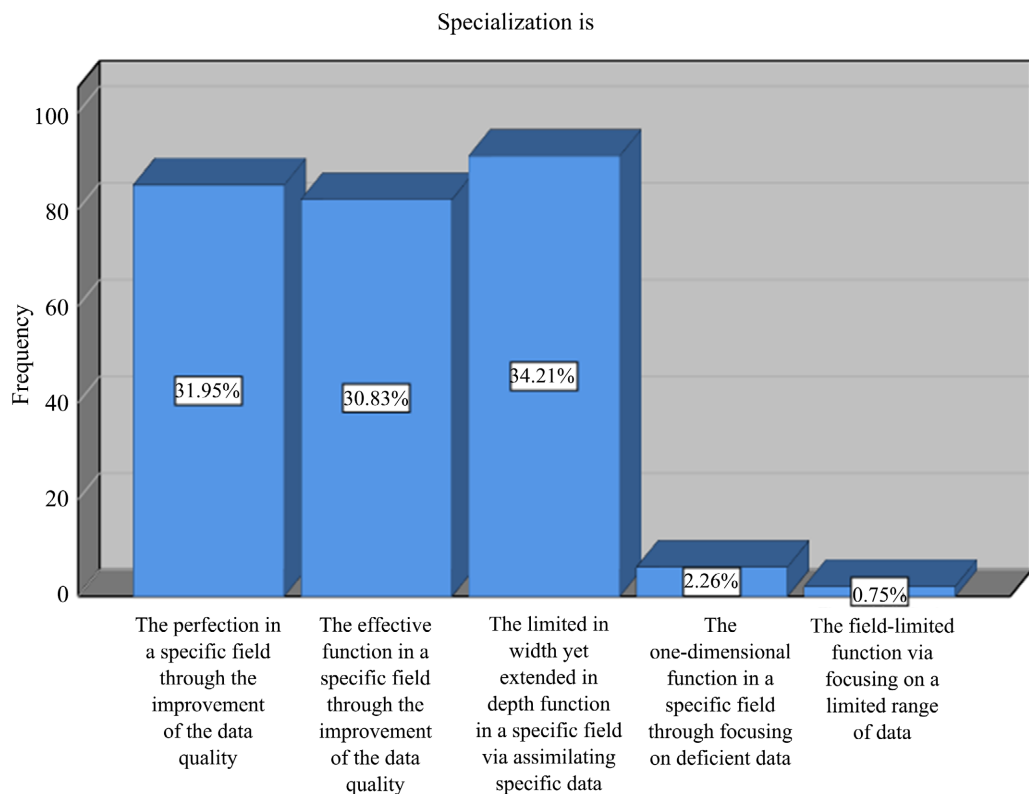
**Figure 10.** Definition of specialization.

Table 7. Test of normality.

Factor	W (272)	p-value
Social-interpersonal relations	0.985	0.005
Personal-free time	0.872	<0.001
Professional activity	0.993	0.234

Table 8. Correlation between factors.

Factors	Social-interpersonal relations	Personal-free time	Professional activity
Social-interpersonal relations	1		
Personal-free time	0.340**	1	
Professional activity	0.436**	0.388**	1

** $p < 0.01$.

4.4. Comparison of Factors

There is a statistically significance difference between the median value of factors ($\chi^2(2) = 203.752, p < 0.001$). In particular, median value of factor “professional activity” ($Mdn = 2.83$) is statistically significantly higher ($p < 0.001$) than median value of factors “social-interpersonal relations” ($Mdn = 2.38$) and “personal-free time” ($Mdn = 2.00$). In addition, median value of factor “social-interpersonal relations” ($Mdn = 2.38$), is statistically significantly higher ($p < 0.001$) than median value of factor “personal-free time” ($Mdn = 2.00$) (see **Table 9, Figure 11**).

4.5. Effect of Demographic Profile

Age: Age is negative correlated with the factor “personal-free time” ($\rho(269) = -0.133, p = 0.030$) (**Table 10**).

Gender: No significant differences were observed for factors of current research between categories of gender ($p \geq 0.068$) (**Table 11**).

Nationality: Factor “social-interpersonal relations” median value of Greeks ($Mdn = 2.38$) is statistically significantly lower ($U = 23, p = 0.026$) than median value of participants of other nationality ($Mdn = 3.31$) (**Table 12, Figure 12**).

Job sector: No significant differences were observed for factors of current research between categories of job sector ($p \geq 0.128$) (**Table 13**).

Salary: No significant differences were observed for factors of current research between categories of salary ($p \geq 0.246$) (**Table 14**).

Level of education: Statistically significant differences were observed for factor “personal-free time” across categories of level of education ($H(2) = 8.903, p = 0.012$). In particular, median value of participants with up to technological level of education ($Mdn = 1.50$) is statistically significantly lower than median value of participants with bachelor ($Mdn = 2.00, p = 0.018$) and with MSc-PhD ($Mdn = 2.00, p = 0.007$) (**Table 15, Figure 13**).

Table 9. Comparison of factors.

Factor	Value	X ² (2)	p-value
Social-interpersonal relations	2.38 (0.63)	203.752	<0.001
Personal-free time	2.00 (1.50)		
Professional activity	2.83 (0.56)		

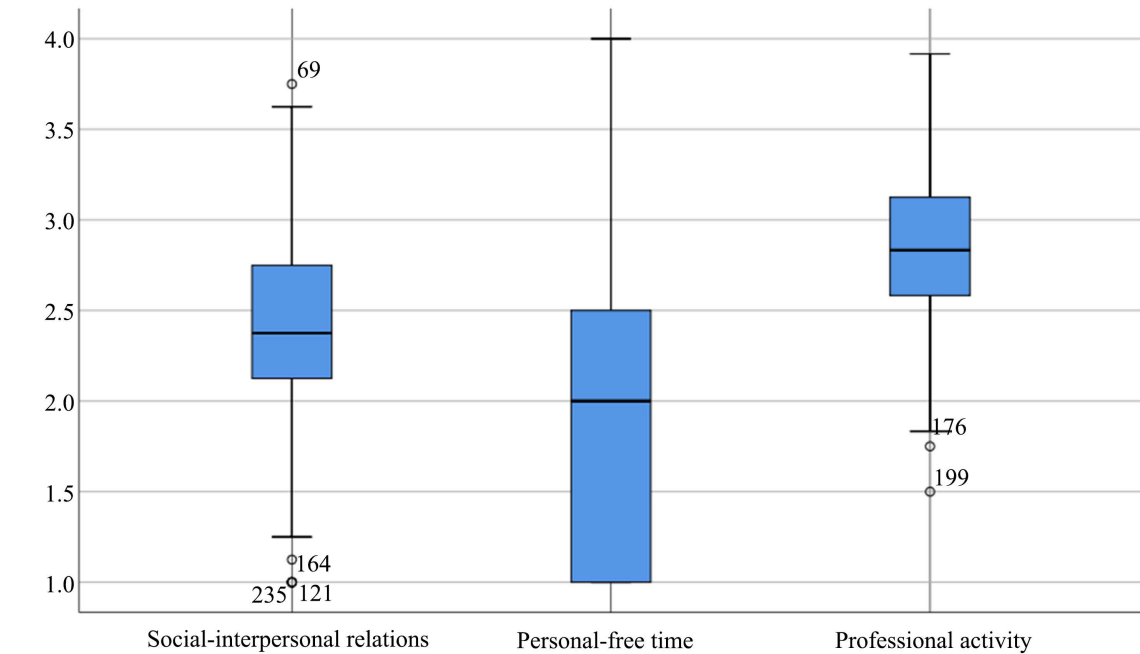
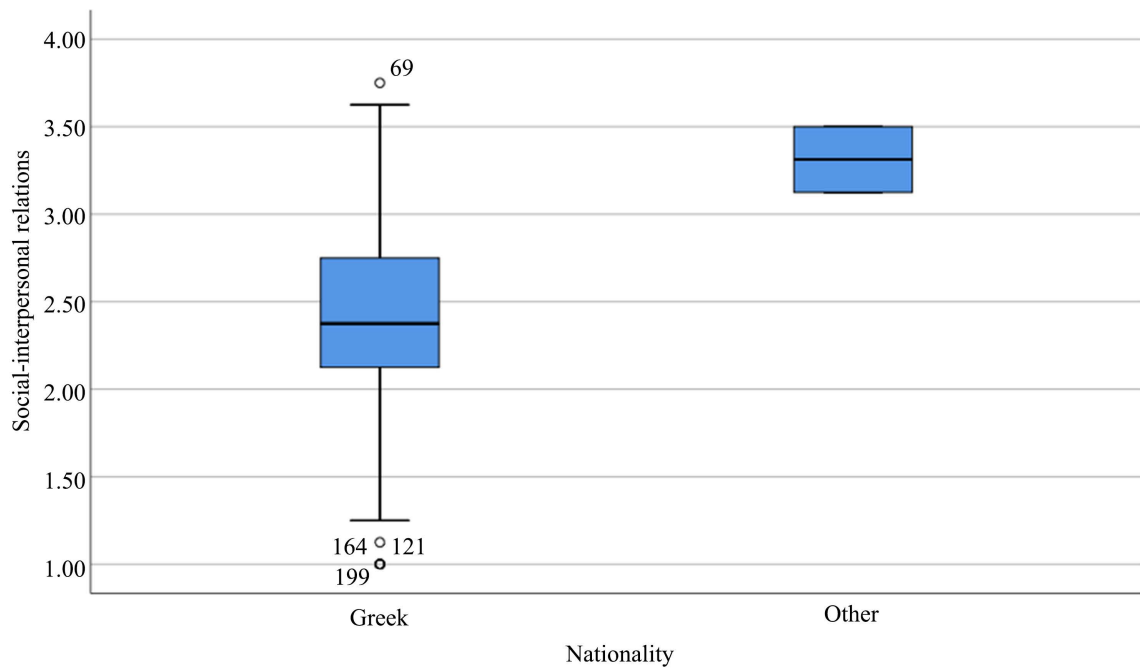
**Figure 11.** Comparisons between factors.**Figure 12.** Median differences of factor "social-interpersonal relations" across nationality.

Table 10. Correlation of factors with age.

Factor	Age
Social-interpersonal relations	$\rho (269) = 0.001$ $p = 0.984$
Personal-free time	$\rho (269) = -0.133^*$ $p = 0.030$
Professional activity	$\rho (269) = 0.064$ $p = 0.298$

Table 11. Comparisons of factors across gender.

Factor	Gender	N	Value	Statistic	p-value
Social-interpersonal relations	Male	123	2.50 (0.75)	U = 7933.5	0.068
	Female	148	2.38 (0.63)		
Personal-free time	Male	123	2.04 (2.00)	U = 8521.5	0.353
	Female	148	2.00 (1.50)		
Professional activity	Male	123	2.87 (0.41)	t (269) = 0.963	0.337
	Female	148	2.82 (0.44)		

Table 12. Comparisons of factors across nationality.

Factor	Gender	N	Value	Statistic	p-value
Social-interpersonal relations	Greek	268	2.38 (0.63)	U = 23.0	0.026
	Other	2	3.31 (0.00)		
Personal-free time	Greek	268	2.00 (1.50)	U = 241.5	0.805
	Other	2	2.25 (0.00)		
Professional activity	Greek	268	2.84 (0.43)	t (268) = -0.107	0.915
	Other	2	2.88 (0.77)		

Table 13. Comparisons of factors across job sector.

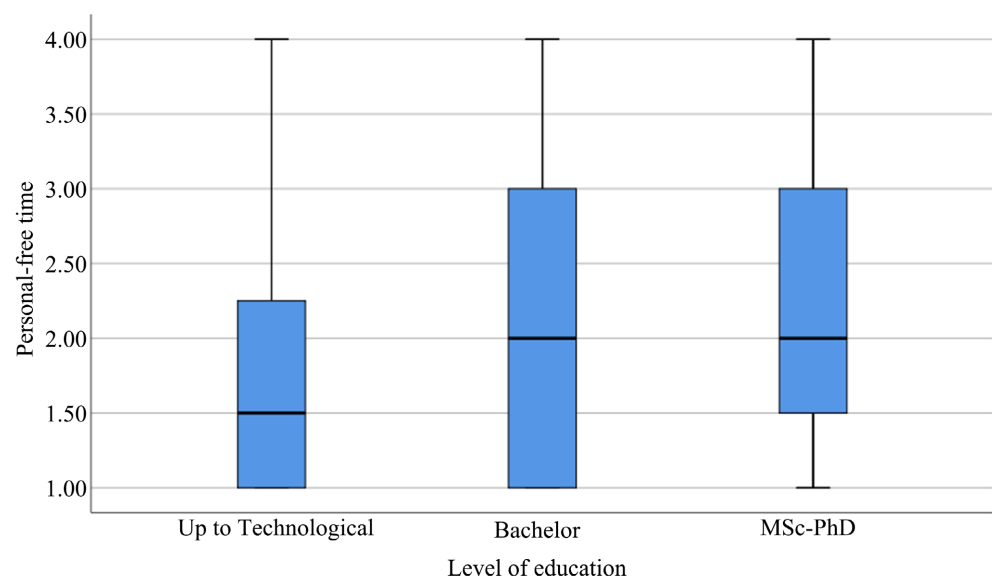
Factor	Job sector	N	Value	Statistic	p-value
Social-interpersonal relations	Private	185	2.38 (0.63)	U = 5762.0	0.128
	Public	71	2.50 (0.75)		
Personal-free time	Private	185	2.00 (1.50)	U = 6291.5	0.593
	Public	71	2.00 (2.00)		
Professional activity	Private	185	2.85 (0.40)	t (111.652) = -0.523	0.602
	Public	71	2.88 (0.47)		

Table 14. Comparisons of factors across salary.

Factors	Salary	N	Value	Statistic	p-value
Social-interpersonal relations	Zero	9	2.25 (0.88)	H (3) = 0.872	0.832
	Low	60	2.38 (0.63)		
	Medium	186	2.38 (0.63)		
	High	13	2.50 (0.94)		
Personal-free time	Zero	9	1.50 (1.50)	H (3) = 1.886	0.596
	Low	60	2.00 (2.00)		
	Medium	186	2.00 (1.50)		
	High	13	2.00 (2.00)		
Professional activity	Zero	9	2.63 (0.36)	F (3.264) = 1.390	0.246
	Low	60	2.86 (0.44)		
	Medium	186	2.85 (0.41)		
	High	13	3.00 (0.47)		

Table 15. Comparisons of factors across level of education.

Factors	Level of education	N	Value	Statistic	p-value
Social-interpersonal relations	Up to Technological	91	2.38 (0.75)	H (2) = 1.504	0.471
	Bachelor	117	2.38 (0.63)		
	MSc-PhD	61	2.50 (0.63)		
Personal-free time	Up to Technological	91	1.50 (1.50)	H (2) = 8.903	0.012
	Bachelor	117	2.00 (2.00)		
	MSc-PhD	61	2.00 (1.75)		
Professional activity	Up to Technological	91	2.78 (0.44)	F (2.266) = 1.854	0.159
	Bachelor	117	2.86 (0.43)		
	MSc-PhD	61	2.91 (0.40)		

**Figure 13.** Median differences of factor "personal-free time" across level of education.

5. Conclusion

Specialization is a complex concept which constitutes not only a phenomenon, but, furthermore, enshrines the aspects of process, condition and personal attribute at the same time. It is neither a new-found term, nor has its premises troubled the mind of both scientists and business entrepreneurs solely the last years. However, the growing rate in which the subject of professional specialty has come to the foreground, dictates for a thorough and systematic research on its facets, as well as its relation with other aspects of human condition, specifically with personality facets (such as introversion and extroversion, proclivity towards cooperation, adjusting in changes, etc.).

Purpose of the current research was to introduce and evaluate the validity of the Specialization Questionnaire as a means to measure the degree of specialization that persons manifest in their daily life; to investigate the concept of specialization, as well as the degree that employees consider this concept in their social-interpersonal relations, personal-free time and professional activity. The sample consisted of 272 participants, of average age 42 years, almost equally distributed regarding gender, with the majority to be of medium salary and level of education, ranging from bachelor to MSc degree.

The findings reflect a more compound image in respect to the initial hypotheses. Regarding the concept of specialization, the participants think that it is: 1) The limited in width yet extended in depth function in a specific field via assimilating specific data; 2) The perfection in a specific field through the improvement of the data quality; 3) The effective function in a specific field through the improvement of the data quality. Employees take into account specialization in high degree when it comes to their professional activity. In particular, they strongly think that specializing in a certain field is necessary in order for the person to improve its performance and they are highly informed by any means of printed or electronic form for the developments on their field of activity/profession. Additionally, they are aiming at excelling in their area of activity/work, they think that specializing in a specific field is related to higher financial incentives, to more facile professional prospects. Furthermore, they consider it important for a professional to be specialized exclusively in a field and that it is necessary in order to achieve professional success, and that specialization facilitates a better achievement of the goals the person sets.

However, the participants tend to disagree that specialization is predominant feature in their social-interpersonal relations. In other words, they are socializing in a personal level with individuals that are not related to their professional field, they find this interaction interesting and contributing to the social evolvement and rising. They do not believe that socializing with individuals from the same field of profession/activity entails more positives in relation to people from different field of profession/activity. Beyond that, they are of the opinion that the person who possesses specialized knowledge in a specific field of activity/work can't necessarily solve the problems that occur in their personal relations more

effectively and that the conversations among the persons they choose to relate with doesn't concern the object of their activity/profession. But at the same time, they regard the interaction with individuals who are active in the same professional field as theirs to be important for the up growth and improvement to that field.

To that direction, they believe that the person could demonstrate equally high levels of performance in multiple fields of activity and that they actually choose to study cognitive/professional fields different from that of their profession. Furthermore, they disagree that the capacity to specialize in certain field entails an increased level of intelligence, they choose to occupy themselves with the subject of their activity/profession and corresponding activities during their personal/free time. Still, they think that the content of the studies and the content of the profession should be identified. The factors of social-interpersonal relations, personal-free time and professional activity were highly positive correlated and this means that participants who highly consider the concept of specialization in one factor, they do so in the others as well. This indicates that people who are specialized or seek to further specialize their professional position, they tend to extend that inclination to other facets of their activity. In relation to the effect of demographic profile, age, nationality and level of education affected the factors of current study. In particular, younger participants and those with a bachelor or MSc-PhD educational level tend to specialize their personal free time. In addition, participants of other nationality consider more the concept of specialization in their social-interpersonal relations than Greeks.

All in all, the hypothesis, that people who are inclined toward specialization in profession they are so in relation to academic studies too, has been met. The hypothesis that the higher the specialization tendency is, the higher the departmentalization is accordingly, is also met to a certain degree. However, the fact that considerable proportion of the overall sample can diversify between working/academic specialization and social/free time is a finding that doesn't allow for a conclusive verification or rejection of the research question. To that extend, more research is required in order to filter out a potential pattern in regard to specialization as a predictor of an inclination that encompasses a wider range of a person's make up.

6. Limitations

The Specialization Questionnaire is a scale aiming at measuring and thus quantifying the specialization tendency, otherwise the specialization degree. As an initial step, is bound to be subjected in future corrections and ameliorations. Despite the fact that the results indicate a direct relation of the Questionnaire with the measurement of specialization stance, there is plenty of room for adjustments. However, it can be used as the first means for investigating the correlation among the person's specialization degree and various personality aspects. A second matter that it should be taken into consideration is the sampling method.

We acknowledge the limitations of the selection approach we furthered. Of all schools in the Hellenic state, we approached those situated in the capital, namely since is the place of our residence and epicenter of our professional activity. To that extent, the urban population and especially of Athens was over-represented in comparison to other Greek cities. Therefore, a future re-calibration of the sample it is required in order to achieve a more balanced representation in terms of geography and rural-urban ratio.

Last but not least, it must also be acknowledged the boundaries, which the cultural factor in itself set. More specifically, the Greek society has undergone through profound existential transformations the last twenty years. The landmarks of that accelerated transition from a mainly agricultural and generic society to a software and services intense economy are mostly traced the last 20 years (the entrance and participation in the European common currency block, the realization of the Olympic games, the financial crash of 2009, the focus on services sector, etc.). The model of the specialized working person who is part of a large corporate family and a small society inside a firm is yet new to the Greek mentality, which is predominantly transpired by the ideal of the personal, individualized company (Greek Industries Association, 2017; Lioukas, 2010). Therefore, a further cross-cultural and cross-societal administering and examination is necessary, so that more inclusive conclusions can be drawn. More importantly, these initial results necessitate a cross-examining with additional personality aspects.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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