

The relationship between empathy and altruistic motivations in nursing studies: A cross-sectional study

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Abstract

Background. According to the biopsychosocial approach and patient-centred models, efficient management of relational competences by healthcare professionals is crucial to affect a patient's treatment and care process positively. Empathy is one of the major components of the relational skills expected of health professionals. The knowledge of the empathic ability of undergraduate healthcare students represents important information for educators in defining specific and efficient educational programs aimed at supporting or enhancing empathic competences. In this study, we measured the attitude towards the value of health professional empathy in clinical encounters of the first-year undergraduate nursing students. Motivations for a nursing education choice were also evaluated. We expected a significant association between students' positive attitude towards the value of health professional empathy and the prosocial and altruistic motivations in choosing nursing studies.

Methods. A cross-sectional study was performed on 77 first-year nursing students. The Jefferson Scale of Empathy – Health Professions Student Version was administered. The motivations for choosing nursing studies were detected through an open question.

Results. Seven distinct themes, distinguishing between internal and external motivational factors, were identified through the thematic analysis of students' answers regarding their choice for entering the nursing degree course. On the empathy scale, females gained higher scores than males. When the age was considered, this difference was shown only for younger students, with young females' total scores being higher than that of young males. High scores of empathy were positively associated with altruistic motivational factors. A negative correlation was found between external motivational factors and the scores of the Compassionate Care subscale of the Jefferson Scale of Empathy.

Conclusions. Knowing the level of nursing students' empathy and their motivational factors for entering nursing studies is important for educators to implement training paths that enhance students' relational attitudes and skills and promote positive motivational aspects central for this profession.

Background

Over the last decades, there has been a growing amount of empirical scientific research on the importance of a good relationship between health professionals and patients for the improvement of the cure and treatment process [1]. The biopsychosocial approaches recognized that health professionals have to consider patients as a whole [2, 3, 4], considering biological, psychological, emotional, and social aspects for appropriate treatment and intervention. A central assumption of the biopsychosocial approach is that every health condition is the result of the interaction between biological, psychological, and social factors.

According to the traditional approach towards health and disease, the disease-centred models in healthcare consider and treat illness merely as an alteration of biological variables, and care and treatment are aimed at compliance [5]. Patients are seen as passive persons for the application of clinical

decisions and prescriptions of health specialists, and they do not have the ability to make decisions regarding their illness. The emphasis is placed on the assessment and treatment of the disease. Aspects relating to patients' life, such as their social life, how their condition affects their relationships, or the emotional reactions to the disease, are mostly overlooked [6].

Conversely, the biopsychosocial approach to health uses a holistic perspective, adopting a person-centred model in which care and treatment are oriented towards concordance [2, 3, 7, 8, 9]. Patients are considered active participants in their care process, and they are responsible for engaging themselves in shared decision-making and influencing their treatment process. Patients are also responsible for the consequences of their decisions and actions taken regarding their health. Biological, psychological, and social factors related to the illness, as well as their interactions, are integrated and considered by healthcare professionals for the comprehension of health, illness, and care [10]. The affective and relational implications of the disease, the treatment, and therapeutic outcomes are brought to the foreground, and they are important together with the biological aspects and diseases.

To this end of placing patients and their illness at the centre of medical attention, physicians and health professionals should recognize relationships and communication as crucial in providing health care. Health specialists need to master interpersonal and communication skills, including the willingness to listen, grasping with interest what the patient communicates, and being aware of the attitudes and psychological characteristics of the patient [11]. Consequently, many educational programs have focused on promoting communication and relationship skills in undergraduate students and healthcare professionals [12, 13, 14, 15, 16]. Effective communication is deemed crucial to high-quality cure and treatment. Besides the technical and practical skills of healthcare professionals, the quality of the relationship between care professionals and patients is essential to affect treatment outcomes and quality of the assistance positively.

To determine if the interaction between clinicians and patients has a beneficial effect on health-related outcomes, different studies were conducted. Kelley et al. [1] conducted a systematic review and meta-analysis of research in which this specific relationship was examined. They suggested that the clinician-patient relationship has a small but statistically significant effect on healthcare outcomes, such as blood pressure, or pain scores. Good interpersonal skills of healthcare professionals and their empathy towards patients have a positive and significant impact on patient satisfaction and adherence to treatment [17, 18, 19], the outcomes of care [20], and a higher agreement on decisions made in the clinical consultation [21]. Studies have also determined empathy as a useful skill for nurses regarding the impact on improved patient outcomes, such as distress and anxiety [22].

Empathy is one of the meaningful skills within the healthcare professional-patient relationship [1, 23]. Moreover, empathy is one of the most powerful personal attributes that health professionals can use to encourage patients' health modification, such as positive clinical outcomes [24]. Patients should perceive health professionals as empathetic people. Empathy allows patients to feel understood, validated, and respected [25].

More attention has been dedicated to this issue, and the importance of an empathic approach by healthcare personnel has been stressed [26]. However, the research debate on the description and operationalization of empathy is still open, with the related considerations about specific instruments for empathy measurement in the health sector in general and in nursing [26, 27, 28, 29, 30].

Empathy does not have a clear and unambiguous definition [27]. It is a multi-dimensional construct, characterized by cognitive and affective aspects [26]. The cognitive empathy refers to the ability by which health professionals understand patients' experiences and emotions and have the competence to communicate this understanding to patients. Emotional empathy is related to emotional responses of participation and sharing of healthcare personnel to the patients' feelings. In a caring relationship, such as the nurse-patient relationship, empathy is principally characterized by the cognitive component [26]. This competence is developed over the course of life and, usually, all individuals are found to have intermediate levels of this ability. However, there are people who have developed more or less empathy. Research studies show that health profession students' empathy decline over the course of their training [31, 32, 33]. Conversely, some recent studies reported no change or an increase of empathy during undergraduate education [34, 35, 36].

Various instruments were created to measure the empathy level in health-related contexts [27, 28, 30]. One of the most used surveys to measure empathy in the healthcare sector is the Jefferson Scale of Empathy (JSE) [37]. Different versions of the JSE were developed, one for physicians and other health professionals (HP version), one for medical students (S version), and a version for students of other healthcare specialties (HPS version) [26], which has been used in this study.

In recent years, based on these research and theories, health schools have devoted more attention to the implementation of training paths to enhance students' relational attitudes and skills and improve empathic competence [12, 38].

In this study, we measured the extent of first-year nursing students' orientation towards empathy. We also evaluated the students' motivation for choosing nursing studies. Students' motivation and reason for choosing a nursing university course and nursing as a career have been explored in different research studies. This choice is a result of a combination of internal and external motivational factors and, sometimes, it is not the first option. Students choose the nursing profession based on their desire to help other people and engage in activities and perform a work with a social benefit [39, 40, 41, 42, 43, 44, 45]. External motivational factors, such as career opportunity and job security, are also important in the career choice [39, 43, 44]. Personal health-related experiences, such as hospitalization, illness of a family member, or a volunteering experience, are detected as additional motivations [39, 41, 42]. Furthermore, students choose nursing studies for their interest in science subjects. Internal motivational factors for entering nursing, such as helping others, are the motivational factors most commonly indicated by students.

We expected an association between students' positive attitude towards the value of health professional empathy and the altruistic motivations for choosing nursing studies. Altruistic motivations refer to the

desire to perform voluntary actions in order to generate a benefit for others, promote well-being, and alleviate a need of others [46].

This relationship was previously explored in medical students. A weak association between empathy and reasons for enrolling in medicine was observed [47]. Another research study showed a significant association between empathy scores of first-year medical students and their intention to pursue people-oriented specialties after graduation [48]. In a recent study, a significant positive association between internal motivational factors (such as altruism or caring for patients) for studying medicine and empathy was shown [49]. A different study concluded that there is no association between the JSE scores and speciality interest in osteopathic medical students [50].

This study aimed to observe the association between empathy and reasons for enrolling in nursing, using a qualitative research method to stimulate the disclosure of most subjective information from students. It was expected to find a significant association between empathy scores and altruistic motivations for a nursing choice. Knowing the attitudes towards empathy is useful to plan effective educational interventions to enhance excellent communication skills of students, which are an essential component of clinical competence.

Research Questions

Research was conducted to evaluate if there is a significant association between students' positive attitude towards the value of health professional empathy and altruistic motivations for nursing studies.

The specific aims of the study were the following:

- to examine the motivations of nursing students to engage in nursing studies through a thematic analysis;
- to explore the occurrence of different motivations of nursing students to engage in nursing studies;
- to examine the association between students' positive attitude towards the value of health professional empathy and altruistic motivations for nursing studies;
- to examine if there are significant gender differences in empathy scores and nursing motivation;
- to verify if there are significant age differences in empathy scores and nursing motivation.

Methods

Participants and context

All students enrolled in the first year of the nursing degree course at the Medical School of a university in southern Italy were invited to participate in the study. According to the local ethical policy, no formal approval by the ethics committee was necessary. We communicated the study design to the institutional board of the degree course guaranteeing that ethical standards would be met, and we received their

consent. At the beginning of the first academic semester, students voluntarily completed the questionnaire. They were informed about the research aim and the study procedure. Data collection was conducted only after obtaining informed consent from students.

Instruments and measures

Students completed a three-part questionnaire to measure these aspects: socio-demographic factors, motivation for choosing nursing studies, and empathy.

Socio-demographic factors. Through a few questions, some sociodemographic aspects were collected, such as age and gender. Furthermore, information related to previous degree experience was gathered.

Motivation for choosing nursing studies. An open question was administered to students to gather information regarding their motivations for choosing to enrol in a university course of nursing. Students were asked to answer the following question: '*Describe your motivations for choosing a degree course in nursing*'. We administered an open question, as it stimulates students to think independently, instead of choosing from predetermined responses in a structured questionnaire. An extensive amount of qualitative data was collected.

Attitude towards empathy. The permission to use the Italian adaptation of the Health Professions Students' version of the Jefferson Scale of Empathy (JSE-HPS) was obtained to measure the orientation towards the value of health professional empathy in clinical contexts [26, 51]. The JSE-HPS is a self-report instrument and includes 20 items answered on a 7-point Likert scale (1 = strongly disagree, to 7 = strongly agree). The questionnaire comprises three factors: a) perspective taking, b) compassionate care/emotional engagement, and c) standing in the patient's shoes. The survey has been developed based on a robust research literature review regarding empathy activated in a relationship aimed to treat and cure a patient, in which health professionals acquire a cognitive comprehension about patients' concerns and their general vision about health and illness, being able to communicate this understanding to their patients. A higher score on the JSE-HPS scale (the score range is 20 to 140) means a greater attitude towards empathic involvement in patient treatment. Studies have showed that females generally have significantly higher JSE scores than males [52, 53, 54, 55].

Statistical Analysis

The students' answers to the open question were analysed using content analysis to investigate the motivations for choosing nursing studies. Two independent evaluators (LM and LS) categorized the students' responses. After an in-depth reading of the responses, the two evaluators independently conducted an analytic segmentation of the contents, with the aim of recognizing themes. Considering the purpose of this analysis, they identified different analytical units in each section of the texts, such as words, phrases, statements, or entire paragraphs, using similar words or expressing the same ideas, from which to extract meaningful core themes. This process of inferential analysis, performed independently by the two evaluators, was followed by a discussion aimed at selecting the relevant categories.

Afterwards, a second examination of the students' answers was conducted to refine the correspondence between content and selected categories. The result was a set of codes, representing single words or short phrases that best described the motivations for the students' decisions.

To compare empathy scores of students with different motivations for choosing nursing studies, a reduction dimension method, in particular, a principal component analysis, was used. Non-parametric tests were performed for gender and age comparisons.

Results

Demographic characteristics

Of the 120 first-year nursing students, 77 (64.17%) completed the three parts of the questionnaire. The mean age was 21.53 ($SD = 4.02$). The sample was comprised of 37.7% males ($n = 29$; $M = 23$, $SD = 3.36$) and 62.3% females ($n = 48$; $M = 20.48$, $SD = 4.80$).

Motivation for nursing studies

The thematic analysis of students' answers to the open question about their choice of nursing degree course identified seven distinct themes:

- The willingness to care for people (HEL)
- Human contact (HUM)
- Healthcare-related personal experiences (EXP)
- Personal interest in scientific topics (TOP)
- Job opportunities (JOB)
- Family tradition (FAM)
- Other

On average, two categories were selected for each subject ($M = 1.86$, $SD = 0.94$). Table 1 summarizes the identified themes and subthemes of the thematic analysis, with a brief description of each.

As showed in Table 2, the highest reported motivation was the willingness to care for and help others (HEL). The second most frequent stated motivation is regarding job opportunities (JOB). The category related to the social influences (FAM) appears rarely in students' reported answers.

Considering the associations among the different categories (see Figure 1), the desire to help others (HEL) in association with the family's influence (FAM) forms a first cluster of motivation. A second cluster is the association between healthcare-related experiences (EXP), such as voluntary work in healthcare settings or a family member's hospitalization, with the desire to enter in contact with other people (HUM).

These two clusters are separated by the cluster formed by the research of job opportunities (JOB) and personal interest in scientific topics (TOP).

This preliminary result suggests a more complex motivational structure with respect to a dichotomous separation between internal and external motivational factors. The internal motivational factors (EXP, HUM, HEL, and FAM) can be subdivided into two clusters. The first cluster groups motivations oriented towards the individual (EXP and HUM); the second groups the other two categories, more related to a prosocial attitude (HEL and FAM). The external dimension appears to be represented by the JOB and TOP categories.

To reinforce this result, an explorative factorial analysis (EFA) was conducted. The parallel analysis confirms three dimensions and, using the principal component decomposition, with varimax rotation, the outcomes in Table 3 have been obtained.

The loads in the table confirm the motivational structure proposed. In particular, the RC2 component appears connected to an external dimension, with job opportunities as the strongest motivational theme. The RC3 component seems to correspond to internal motivations oriented to individual interests, with major loadings on the categories EXP and HUM related to personal experience and human personal contact, respectively. Finally, the RC1 component reflects the internal motivations with a prosocial orientation, and the categories HEL and FAM prevail, that is, categories oriented towards the needs of other people. The subsequent part of this paper will analyse the correlations with the JSE questionnaire.

Other motivations, such as some students not being able to pass admission tests to other degree courses, do not appear classifiable in the identified categories. These motivations were not included in this analysis due to their scarcity and heterogeneity.

Observing the frequencies of the different categories with respect to gender and age, some differences can be highlighted (see Table 2). In females' motivations, the categories that refer to the willingness to help and care, as well as health-care related experiences, are recurrent (HEL, HUM, and EXP). In males, the highest reported motivations, other than the HEL category, are more oriented towards job security (JOB) and interest in scientific topics (TOP). This gender difference is statistically significant ($\chi^2 = 34.22$, $df = 5$; $p < 0.01$).

For the younger students ('Young' and 'Mid' classes in Table 2, age ≤ 21), the frequencies of the motivation categories are not different with respect to the total sample. Older students ('Old' class in Table 2, age > 21) showed to give more relevance to motivations related to job opportunities (JOB). These differences have a weaker statistical significance ($p < 0.04$).

Empathy scores

Regarding the JSE-HPS administered to the first-year students in the nursing degree course, some descriptive statistics are reported in Table 4. The mean and standard deviation of the JSE-HPS empathy

total scores and the statistical analysis are summarized. The statistics obtained agree with the expected values and confirm a good external validity of the data collected in this sample.

Taking gender into account (Table 5), the mean of empathy scores was higher for female students ($M = 114.90$, $SD = 10.20$) than for males ($M = 106.90$, $SD = 12.97$). The distributions of the scores for gender cannot be considered normal; therefore, to confirm a difference in mean, the non-parametric Kruskal-Wallis test has been used. This test confirms a significant difference ($\chi^2 = 6.73$, $df = 1$; $p < 0.01$). This difference is more significant if the subscale 'Compassionate Care' is considered ($\chi^2 = 11.16$).

Regarding age, there is no significant correlation between the JSE scores and students' age when tested with an ordinary linear regression model. The separate analysis of each of the three age classes ('Young', with age ≤ 19 ; 'Mid', with ages between 20 and 21; 'Old', with age > 21) confirms any differences among the groups. The study of the interaction between age and gender shows a significant effect for the differences in the total JSE scores only in the case of younger students, with young females' total scores being higher than that of young males ($p < 0.05$). For the other two age classes, these differences are not statistically significant.

Associations between the motivation for choosing nursing studies and the JSE-HPS empathy scores

The data in Table 5 show higher empathy scores associated with internal motivation, particularly with the internal motivations with a prosocial orientation (HEL and FAM). The external motivational factors (JOB and TOP) are associated at mean scores below the average.

For a statistically significant analysis of the associations between motivation and empathy scores, the results of the factor analysis were used.

Starting from the results in Table 3, it is possible to obtain a personal score vector for each student in the sample, which summarizes their position in the three-dimensional space defined by the three components: RC1, RC2, and RC3. Consequently, it is possible to regress any component on the JSE-HPS scores. When the JSE scores are used, we obtain two interesting correlations: a positive one between the prosocial scores (RC1) and the JSE total scores; and a negative correlation between the external dimension scores (RC2) and the scores in the JSE-HPS subscale 'Compassionate Care' (see Table 6). No other analysis shows statistically significant results.

The association between prosocial and altruistic motivations and high scores in an empathy measure is an interesting and new result. This analysis can help to understand the empathy construct better, particularly how some specific empathy components are correlated with some motivational dimensions. In this study, the empathy component related to the compassionate care and emotional engagement appear more important if the internal/external structure of the motivational landscape is considered.

Discussion

This study aimed to investigate the association between nursing students' positive attitude towards the value of health professional empathy and the altruistic motivations for choosing nursing studies. We hypothesized a positive association between these two dimensions. We also hypothesized the association of empathy scores with age and gender. First, the motivations to engage in nursing studies were examined through a thematic analysis. This analysis has shown an interesting motivational structure, with the internal motivations appearing separate in two sub-dimensions: one more related to the individual interest, such as personal life experiences or interest in human contact; another more related to an altruistic stance, where an important role is played both by the desire to help other people and the family's influence. The external extreme of the motivational scale seems occupied by motivation related to the topic of study and search of job opportunities. A large proportion of students (74%) indicated altruistic motivations for choosing nursing studies, corresponding to the literature on this topic [39, 40, 41, 42, 43, 44, 45]. The analysis of gender differences shows that the internal motivations are more present in females' responses to the open question, as opposed to male responses, more oriented towards external motivations. Furthermore, female students reported a higher mean score on the JSE; these results are consistent with those of other studies, in which women significantly reported higher empathy scores [52, 53, 54, 55]. Different explanations have been given for gender differences in empathy scores, such as genetic predispositions and social learning.

When the age was analysed, no significant differences in motivation were observed. The only relevant difference is regarding the motivation related to job security, which is mainly indicated as motivation for choosing nursing studies by students older than 21 years. The empathy measure does not appear to be significantly influenced by the students' age.

Regarding the initial principal hypothesis that altruistic motivations for choosing nursing studies and students' positive attitude towards the value of health professional empathy are significantly associated, the obtained results are interesting. Using the outcome of the principal component analysis in this study, two relevant correlations emerged. The internal motivation with a more altruistic characterization is positively correlated with the empathy scores. Moreover, when the external motivations are considered, a negative correlation is found between these motivations and the JSE-HPS subscale that measures the emotional engagement and compassionate care. Previous studies have underlined the positive association between scores on person-oriented motives for entering medical school and empathy [47, 49]. To the best of our knowledge, there are no studies regarding the investigation of this association in the nursing sector.

This study has some limitations. The use of a qualitative analysis for detecting motivations makes it difficult to generalize the results of this study to other subject samples. The use of a structured questionnaire could be more appropriate for generalizing the results. The inclusion of students from a single institution may also limit the generalizability of the findings of this study. Another aspect to consider is social desirability. Owing to the nature of the construct, the measurement process of empathy is often deeply affected by social desirability bias and acquiescence. Therefore, future research should

use a different typology of measurements, such as implicit measures of empathy, or measurements of patients' perceptions on the health professional's empathy.

Conclusions

There are different studies that consider empathy as a modifiable dimension that can be a trainable subject [12, 16, 38, 56]. Knowing the level of nursing students' empathy is important for educators to implement training paths to enhance students' relational attitudes and skills or slow the decrease in empathy. Moreover, it is crucial to promote specific interventions and activities to support or reinforce positive motivational aspects already present in students, which are essential for nursing profession.

In summary, this study intends to contribute to a better understanding of the association between empathy and altruistic motivations in engaging in nursing studies. A longitudinal study could help to better understand the evolution of personal motivations and the attitude towards empathy as well as their associations with specific characteristics of the educational context.

Abbreviations

JSE: Jefferson Scale of Empathy; JSE-HPS: Jefferson Scale of Empathy - Health Professions Students; EFA: Explorative Factorial Analysis.

Declarations

Ethics approval and consent to participate

According to the local ethical policy, no prior formal authorization approval by the Ethics Committee was necessary. We communicated the study design to the Institutional board of the Undergraduate Nursing Course guaranteeing that ethical standards would be met, and we received approval. All participants were given detailed information about the study. Data collection was carried out only after obtaining voluntary informed consent from students.

Consent for publication

Not applicable.

Availability of data and materials

The datasets analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Not applicable.

Authors' contributions

LM was responsible for the conception and design of the work, and acquisition of data. LM was the primary writer of the article and contributed to the interpretation of data. LM and LS were involved in the process of independently coding of the responses. LS performed statistical analysis of data and participated in interpretation of data and writing of the manuscript. MA reviewed the manuscript and made revisions in important intellectual content. All authors approved the final manuscript.

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Tables

Table 1. Inductively inferred categories

Theme	Brief description	Illustrative quotes
HEL	The willingness to feel useful and to affect the health of others.	<i>'I want to be of help to others; I want to contribute to trying to improve the lives of others.'</i> <i>'I chose this degree program to make myself useful with the next.'</i>
HUM	The desire to enter in contact with other people.	<i>'I chose the degree course in nursing ... because I like being in contact with people.'</i> <i>'I love being in contact with people.'</i>
FAM	Significant others, such as family members, have significant influence on the students' career decision.	<i>'Also, because there is a nurse in my family, that is, my grandmother, who was always an example for me.'</i> <i>'When my brother, also a nurse, told me about his experiences in the ward, I was fascinated.'</i>
TOP	A personal interest in health-related scientific topics.	<i>'I chose this course of study because I like the subjects in this degree course.'</i> <i>'First of all, because I love the subjects that are studied in the nursing degree course.'</i>
JOB	The possibility of a secure employment and job stability.	<i>'I chose the undergraduate degree in nursing... to have a greater job opportunity after finishing the course of study.'</i> <i>'Another reason ... is because I hope to find work faster.'</i>
EXP	A healthcare-related experience, such as voluntary work in healthcare settings or a family member's hospitalization, have influenced the choice.	<i>'I have chosen to undertake these studies and subsequently enrol in the degree course in nursing because I feel alive only when I help and offer support to others and I received confirmation following the illness of a person to whom I was very attached.'</i> <i>'I found myself at home in close contact with a grandfather to look after, I was his personal nurse, and this made me a happy person.'</i>
Other	Not being able to get into other chosen study programme, etc.	<i>'...I tried (to get into) medicine degree course, but I wasn't admitted.'</i>

Table 2. Absolute and relative frequencies of motivation categories; relative frequencies of categories with respect to students' gender and ages

	n	Tot (%)	Females (%)	Males (%)	Young (%)	Mid (%)	Old (%)
EXP	14	18.18	25.00	7.41	18.75	22.22	11.11
HUM	19	24.68	27.08	22.22	25.00	29.63	16.67
HEL	57	74.03	83.33	62.96	75.00	81.48	61.11
FAM	5	6.49	4.17	11.11	3.12	7.41	11.11
JOB	22	28.57	18.75	48.15	28.12	22.22	38.89
TOP	17	22.08	16.67	33.33	18.75	25.93	22.22
Young: students with age £ 19 years; Mid: students with age >19 or £ 21; Old: students with age > 21							

Table 3. The outcome of the principal component analysis for the motivational categories

	RC1	RC2	RC3
EXP	-0.25	-0.54	0.55
HUM	0.07	0.14	0.91
HEL	0.63	-0.42	0.07
FAM	0.68	0.11	-0.10
JOB	-0.08	0.88	0.14
TOP	-0.63	0.01	-0.03

In bold the factor that each variable loaded most strongly on

Table 4. Descriptive statistics for JSE-HPS (N = 77 first-year nursing students)

Statistics	Total	Perspective Taking	Compassionate Care	Standing in patient's shoes
Mean	111.88	57.6	44.69	9.60
Standard Deviation	11.90	7.35	5.39	2.66
25 th percentile	104	53	41	8
50 th percentile (median)	113	60	45	9
75 th percentile	122	62	49	11
Possible Range	20-140	10-70	8-56	2-14
Actual Range	75-132	36-70	28-55	4-14
Cronbach's alpha	0.79	0.65	0.58	0.56

Table 5. Comparisons of the JSE-HPS total scores for first-year nursing students with respect to different groups: gender, age and motivational categories

Groups	<i>n</i>	<i>M</i>	<i>SD</i>
<i>Sex</i>			
Male students	29	106.90	12.97
Female students	48	114.90	10.20
All students	77	111.88	11.90
<i>Age class</i>			
Young	32	112.75	11.86
Mid	27	110.41	11.92
Old	18	112.56	12.39
<i>Nursing motivation</i>			
Healthcare-related personal experiences (EXP)	14	112.86	15.38
Human contact (HUM)	19	109.84	13.48
The willingness to care for people (HEL)	57	112.95	9.80
Family tradition (FAM)	4	113.00	11.25
Job opportunities (JOB)	22	109.59	12.35
Personal interest (TOP)	17	105.35	15.32

Table 6. Two regression models between the RC1 and RC2 dimensions for students' motivation and JSE-HPS scores

	<i>Estimate</i>	<i>SE</i>	<i>t value</i>	<i>Pr (> t)</i>	
<i>Model: RC1 ~ JSE_TOT</i>					
(intercept)	-1.888	1.070	-1.765	0.0816	.
JSE_TOT	0.017	0.009	1.777	0.080	.
<i>Model: RC2 ~ JSE_CC</i>					
(intercept)	1.865	0.939	1.986	0.051	.
JSE_CC	.0.042	0.021	.2.000	0.049	*

JSE_TOT: JSE-HPS total score. *JSE_CC*: scores in the JSE-HPS subscale 'Compassionate Care'

Figures

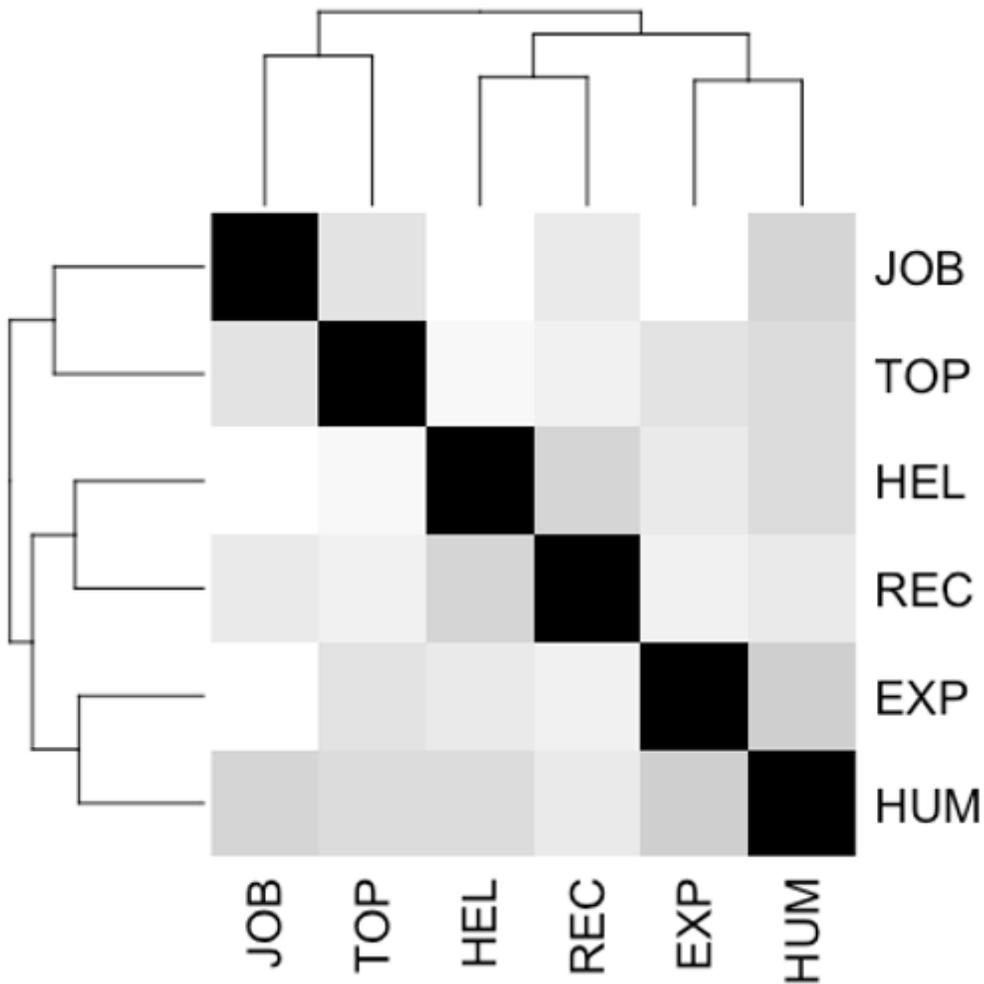


Figure 1

Associations among categories using the correlation matrix The intensity of grey indicates a stronger association; clusters are highlighted on the left and superior margins