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Music Therapy Enhances Perceptive and Cognitive Development in People with Disabilities. A Quantitative Research

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ABSTRACT

Music therapy is a developing profession in Greece with limited research conducted in relation to its effectiveness and use. The drive for this research began from the need to document areas where music therapy is known to flourish in other countries, yet no research would prove so for Greece. The key objective was to assess the effectiveness of music therapy through the personal evaluations made by the parents of the subjects. The subjects' characteristics and parental environments were documented as populations who participated in the practice of music therapy in Greece. Quantitative research was conducted upon the parents of 149 subjects with disabilities. Questionnaires were used as research instruments, which were answered by the subjects' parents. The data was processed with the statistical instrument SPSS v.12 with hypothesis validity set at a=0,05 and twofold crosschecking. This is the first Greek quantitative research designed to unravel the effectiveness of Music Therapy for children and adults with disabilities in Greece. The results show that Music Therapy is perceived by the parents' subjects to be: 1) effective regardless the pathology of the subjects; 2) most effective with severe pathology conditions; 3) effective regardless the co-practice of other therapies; 4) effective in perceptive and cognitive development.

I. INTRODUCTION

Music Therapy is a new and developing profession in Greece. Therefore, very limited research has been conducted so far to investigate its use and its effectiveness in Greece. Although, music therapy is well documented as an effective therapy practice in other countries, this is not the case in Greece. This is the first quantitative Greek study aiming to research the effectiveness of music therapy interventions to people with disabilities as their parents evaluate it. Subjects from all over the country with various pathologies, characteristics and ages who might combine music therapy with other services or have music therapy as their only therapy were identified. The researchers assessed the evaluations of their parents' perceptions on the effectiveness of music therapy. The subjects' characteristics and parental environments were documented as populations who participated in the practice of music therapy in Greece.

II. LITERATURE BACKGROUND

Music therapy has been widely used in interventions for people with disabilities. Italy, United Kingdom, France, Switzerland, Korea, Japan and the United States are few of the countries worldwide that have established the music therapy professions and recognize the services from trained-licensed and certified music therapists. Compared with other interventions, music therapy is gaining growing recognition for its use of live music making to engage with the client and meet their therapeutic needs (Bruscia 1988). It is gaining growing recognition for its efficacy in engaging children at their level of interest and helping them to develop spontaneous self-expression, emotional communication, and social interaction (Kim, Wigram & Gold, 2008). Music acts as an emotional, relational, and motivational medium, which is purposefully created to enhance "interpersonal relatedness" during the music therapy sessions for a variety of disability categories such as Autism, Down syndrome, Intellectual disabilities, and/or physical impairments (Gold, Wigram, & Elefant, 2006; Trevarthen and Aitken, 2001).

Music becomes a medium that enables the child to communicate his feelings and to have meaningful interpersonal and expressive experiences with the therapist (Graham, 2001). The music therapy experience has a positive impact on people with intellectual disabilities as it allows them to understand and express their feelings, to organize their physical reactions and to socialize by focusing on a common musical goal. The certified music therapist can assist the participants through individualized or group music therapy sessions to meet their potentials, tap into their abilities and experience personal, emotional and academic growth.

Oldfield and Adams (1990) studied 12 adults diagnosed with intellectual disabilities. They participated in a music therapy intervention for 20 weeks and the study reports favorable outcomes for the music therapy intervention.

Overall, studies worldwide suggest that musical elements such as the rhythm, the melodic contour, and the dynamic structure can be effective in engaging children with disabilities when they are applied purposefully during music therapy interventions (Buday, 1995; Browell 2002; Farmer 2003). The studies are encouraging regarding the effectiveness of music therapy and clearly show that the music therapy profession is an integral part of the services offered to people with disabilities and to their families.

III. METHOD

For the purpose of this study a quantitative research was conducted upon 149 subjects. Questionnaires were used as research instruments, which were answered by the parents of individuals with disabilities. Parents were chosen as a sample population because: 1) In the Greek culture parents are the main and central carers of people with disabilities and they take very active part in the development of appropriate therapy institutions in the country. 2) Greek parents of individuals with disabilities, are interested witnesses of their children's' development and they are aware of their children's situation before and after music therapy. 3) Parents of children with disabilities appear to be more objective in their subjective evaluations of their children's processes, than the children's therapists who could be biased since they are involved in the process. 4) Parents' perception and communication skills support the completion of questionnaires where individuals with disabilities might confront tremendous difficulties to complete those questionnaires.

The data was processed with the statistical instrument SPSS v.12 with hypothesis validity set at a=0,05 and twofold crosschecking.

Data collection was achieved via a questionnaire designed by the researchers. The questionnaire was given to families who have members participating in music therapy sessions in Greece. Prior to the distribution of the questionnaire the researchers contacted the special institutions and explained the significance of this research for the further establishment and development of the music therapy profession in Greece -which could benefit more individuals in need- and created a highly supportive ground where the representatives of the institutions were motivated to strongly encourage parents to take part in the research. The institutions' representatives received the questionnaire by the researchers which they then distributed to the subjects' parents after having the parents sign the consensus form, which safeguards the anonymity and confidentiality of the participants in this research. After the institutions' representatives collected the completed questionnaires, they mailed them back to the researchers. 150 questionnaires were mailed in different parts of the country: 50 in Thessaloniki, 23 in Athens, 10 in the mainland, 30 in Central Macedonia, 17 in Epirus, and 20 in Various Aegean islands.149 out of the150 questionnaires were filled in by the participants and mailed back to the researchers. This astonishing response shows how interested parents are in contributing to the profession's further research and development.

The study was conducted from May 2008 until January 2009.The questionnaire was created according to the diagnosis criteria of the Pedagogical Institute of Athens-Greece for People with Intellectual Disabilities (http://www.pi-schools.gr/). Also, the researchers used the diagnostic criteria of the Cyprus Health Ministry for students with intellectual disabilities (http://www.pi.ac.cy/pi/index.php?lang=el). The research tool developed was based on TEACCH Program evaluation method of socializing, (Olley, 1986), as well as, in methods of teaching and social skills evaluations (Watson, 1988, Hobson, 1993, Quill, 1995, Boswell & all, 1998, Jordan, 2000, Powell & Jordan, 2000, Jordan & Powell, 2000). While creating the questionnaire elements from the Basic Skills Check List (Pedagogy institute, Ministry of Education-Greece, 2000) were used.

The questionnaire was divided in two parts: The general part and the specific part. The *general* part had 12 close-questions and it was divided in three theme-units. The first theme-unit (4 questions) included demographic questions for the subjects, the second theme-unit (4 questions) included demographic questions for their parents and the third unit (4 questions) included questions about the music therapy program/interventions that the child was having.

The *specific* part had 13 closed-questions. In this part the parents of the child were asked to evaluate the music therapy experience of their child as it was related to the main challenges that their child was facing in everyday life. For the two last questions the parents were asked to evaluate the music therapy program in general.

The SPSSv.12 was used for the data analysis. The effect size was set to a=0.05 and they were checked by another researcher for ensuring inter-researcher reliability. The official statistical research process was followed.

IV. DATA ANALYSIS

The first theme-unit on the demographic data for the music therapy subject showed the following: The subjects had an average age of 18 years old, and the majority of them (58%) were males. There are nine disability categories mentioned; intellectual disability is the most prevalent among them (42, 3%), autism is the second most common (24, 2%) and Down syndrome is the third more prevalent disability category (18, 1%). Regarding the subjects diagnosed with autism there was a ratio of 4:1 among males and female participants of this study. This confirms the relevant bibliography in autism. The higher majority of the subjects (84, 6%) attended public special education schools. An important finding of this study ($t = -15.08$, $p=0$) was that the younger subjects seemed to be enrolled in general education settings (6.4 years compared to 19.8 years for the older patients). The research showed this as indicative of an "initial resistance" the parents show when they first get the diagnosis for their child. Further inquiry on this data set showed that the parents' education is an important predictor ($x= 13.112$, p-0.004, 3 d.f.) for the type of the education of the subjects; there is a correlation between the parents' education level and the years that their child has been attending a general education setting (Cramer's $V=0.298$, $p=0.004$, 3 d.f.). The schema that occurred was: higher education- higher resistance –choice of a general education setting.

The second theme-unit analyzed the average age of the parents. The fathers were 51.18 years old and the mothers 46.27 years old. There is a five-year-old age difference, which is typical for the Greek couples of this generation. The majority of the parents were married (87.25%). Divorced couples (7.38%) were found to have their children at a younger age compared to the married participants.

The third theme-unit analyzed the characteristics of the music therapy treatments offered. On average the duration of music therapy treatments was 2.5 years. There is a strong correlation between the age of the participants and the duration of the treatment: the older the participant, the longer the treatment offered ($r=0.985$, $p=0$). The patients choose their therapy based on their diagnosis (Cramer's $V=0.56$, $p=0$).

Subjects diagnosed with intellectual disabilities typically have group therapy sessions, while subjects with Down syndrome or in the Autism spectrum have individualized sessions ($p=0.05$). Also, younger subjects ($m=13.3$ years old) attended individualized therapy sessions and older patients ($m=21.7$ years old) group therapy programs ($p=0.01$).

Another important finding of the study was the referral process. The doctors of the subjects have not referred their patients for music therapy or other complimentary therapies. Teachers and psychologists gave referrals or suggestions for music therapy; teachers referred their students to group music therapy sessions (61.8 %, $p=0.034$) and psychologists referred their clients both to group music therapy (49.3%) and individualized music therapy sessions (50.7%).

V.FINDINGS

A. Findings on the Effectiveness of the Music Therapy Treatment as Perceived by the Subjects' Parents

The parents were asked to respond to a questionnaire in order to assess the progress of their child before and after the experience of the music therapy sessions concerning their perceptive and cognitive development. Four different domains were evaluated:

1. Ability to listen (2 questions)
2. Psychosocial growth (3 questions)
3. Intellectual growth (2 questions)
4. Emotional growth (3 questions)

All of the questions focused on the subjects' characteristics before and after the music therapy experience. The parents were asked to use a four point scale: "Not at all important", "Of little importance", "Sufficiently", "Important", "Very important". The responses were graded with a scale ranging from 0 to 4 according to the following:

"Not at all important" (0),
"Of little importance" (1),
"Sufficiently" (2),
"Important" (3),
"Very important" (4)

B. Statistical Significance

The responses were assessed for their statistical significance with the Willcoxon test and the Sign test. (Table 1)

The data shows that the difference in all the parameters before and after the music therapy sessions is statistically significant, p=0. There is an overall positive reflection of the music therapy experience on the participants calculated as m=1.9 before the music therapy experience to m=3.09 (after the music therapy experience).

C. Evaluating the Music Therapy Experience in Different Sets of the Sample

The researchers, also, evaluated the personal growth of each subject in the study based on other elements: their disability category, the individualized versus group sessions, the education of the parents, the duration of the music therapy services they have received and their sex. The goal was to assess the efficacy and/or superiority of music therapy interventions in relation to one of those elements. The new variable was named "personal growth" and was assessed by calculating the difference between the pre and post responses of the parents regarding the music therapy effect on their child. Table 2 and the graph 1 show the distribution of "personal Growth" (mode= 23, median=11.8). The subjects were distributed according to their diagnosis. The Anova test did not show a statistical difference based on the diagnosis (F5, 140=1.262, p=0.284). According to this analysis, music therapy did not prove to be more beneficial for a specific disability category (Graph 2).

Table 3 shows the effect of music therapy based on the sex of the subjects. There was no statistically significant difference based on the sex of the subjects (t test, t=1.78, p=0.006).

Graph 3 shows the effect of music therapy based on the program the subjects were attending: individualized sessions or group music therapy (F2, 46=2.297, p=0.104). Again, there is no statistically significant difference between the group music-therapy versus the individualized sessions for the subjects of this study (as perceived by their parents).

This statistical analysis shows that the mean of the data is differentiated according to the academic level of the father. According to the post hoc LSD method analysis, subjects whose fathers had higher education have reported less growth (p=0.071) compared to the participants whose fathers had lower education. (Table 4)

Personal growth is also correlated with the duration of the music therapy services that the subjects received. First, all the subjects showed a positive correlation between the duration of the services and their growth (r=0.161, p=0.025). The same correlation was studied for the patients who had been receiving music therapy services for up to three years (123 subjects or 82, 5%) and then for the subjects who had been receiving music therapy services for up to two years (106 subjects or 71%). When looking at those two last categories there was an important raise in the correlation (r=0.241, p=0.004 and following r=0.339, p=0). Music therapy is shown to be more beneficial to the subjects for the first two to three years of services offered.

Finally, there was no statistical significance for the subjects who were having other therapies additionally to the music therapy. Anova analysis showed zero hypothesis (F8, 134=1.161, p=0.328). Attending other complimentary therapies additionally to music therapy did not alternate the findings regarding the positive effect of music therapy for the subjects (Table 5).

D. A New Variable to Assess the Efficacy of Music Therapy

Comparing the level of competency for each of the subjects before the music therapy sessions helped assess the efficacy of music therapy. This variable was named: "Assessing initial condition" (Graph 4) and was calculated by summing the score for all the variables of the questionnaire. Graph 5, which maps out the two variables: "Personal growth" and "Assessing initial condition", shows a negative correlation. Pearson computation confirmed these findings (r=-0.632, p=0). It is safe to conclude that the most severe and profound the disability of the subjects the most positive influence music therapy has on the subjects.

E. Overall Parent Assessment for Music Therapy

Graphs 6 and 7 respectively show that the majority of the parents expressed positive views regarding the efficacy of music therapy. Most of the parents indicated that they would recommend music therapy to people with similar problems to their child. 10% of the parents reported that they were little satisfied and only 6% were skeptical towards recommending music therapy to other people. Their responses are closely related to the progress that their child has made during the music therapy process. The higher the growth of the subject, the higher was the expression of satisfaction on behalf of the parent and the eagerness to recommend it to other people (Tables 6 and 7 respectively). Finally the assessment of the parents towards the efficacy of music therapy is not related with the disability category of their child.

VI. CONCLUSION

Two main conclusions have come from the statistical analysis of the data. The first one is about the profile of the subjects who participate in music therapy sessions. Typically, they are individuals of both sexes, in their teen or youth. Intellectual disability, autism spectrum disorder and Down syndrome are the three most prevalent disability categories. They attend special education classrooms and they decide to have music therapy sessions after getting the school's teacher or the school's psychologist referral and recommendations for music therapy.

The second one is about the efficacy of music therapy interventions according to the parents' subjective evaluations. The responses to the questionnaires showed that parents value highly the music therapy experience of their children, as an efficient complimentary therapy. Parents highlighted the improvements that their child showed in the areas of perception, cognition, communication and social skills. The first two and a half years of music therapy have a greater affect on the subjects, especially for those who have more severe issues. Overall, according to the findings of this study, music therapy is regarded as an efficient intervention aiming to improve the perceptive, cognitive, communication and social skills of people with disabilities and it is highly recommended by the participants of this study. Thus, the researchers agree that other professionals should recommend music therapy and parents should get referrals for music therapy interventions.

VII. DISCUSSION

The findings of this research support that music experience can help people with intellectual disabilities grow in domains such as: 1) the listening ability by enhancing the ability to discriminate between sounds, to respond to different sounds, and to react emotionally to different sound stimuli 2) the psycho-social function by responding to music and using body muscles to act back to the sound stimuli 3) the intellectual ability by enhancing the attention span, 4) emotional growth by socializing and working together with the therapist for a common musical goal.

Based on the perceptions of their parents the results of this research show that the subjects had improvements in their attention span, in making choices and in interacting efficiently with the music therapist and other personnel.

In the aforementioned studies the staff that was working closely with the participants assessed the efficacy of the music therapy intervention. In this study, the efficacy of the music therapy intervention was assessed by the parents of the participants because the researchers strongly believe that the parents of the participants have a better insight and stronger understanding of the strengths and the growth of their children compared to the personnel who is working with them at school or in other settings.

This study is only the first attempt to evaluate the efficacy of music therapy interventions offered in Greece. More research with larger samples, standardized measures and clear intervention descriptions is needed to strengthen the clinical applicability of these results and to examine the effects of music therapy for children with disabilities in Greece.

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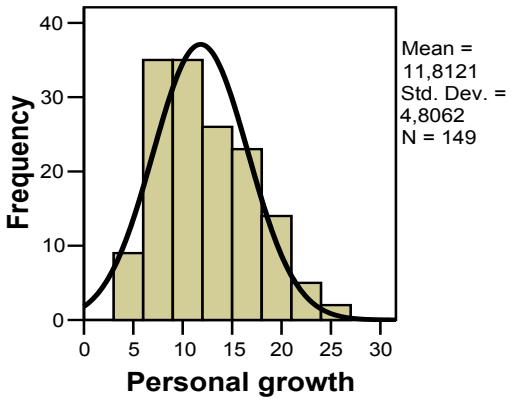
Table 1

Questions	Pre value	Post value	Value|Z| Willcoxon	p-value	Value|Z| Sign	p-value
1.Listening ability						
Response to the sound	1,81	3,36	9,853	0	10,104	0
Location of sound	2,36	3,36	8,904	0	9,849	0
2.Psychokinesthetic response						
Combination of act with sound	1,78	3,02	10,011	0	11,091	0
Eye movement to rhythm	2,18	3,25	9,485	0	10,441	0
Rhythm response	1,91	3,09	10,117	0	11,136	0
3. Cognitive ability						
Concentration while performing an	1,52	2,88	10,25	0	11,402	0
Time span of concentration	2,06	3,23	10,481	0	11,402	0
4. Emotional response						
Family collaboration	2,04	3,00	10,012	0	10,677	0
Peer interaction	1,68	2,82	10,236	0	11,181	0
Turn taking	1,74	2,90	10,103	0	11,091	0
Total	1,908	3,091				

Table 2

N	Valid	149
	Missing	0
Mean		11,8121
Median		11,0000
St. Deviation		4,80620
Skewness		,455
Minimum		3,00
Maximum		26,00
Quartiles	25	8,0000
	75	15,0000

Graph 1



Graph 2

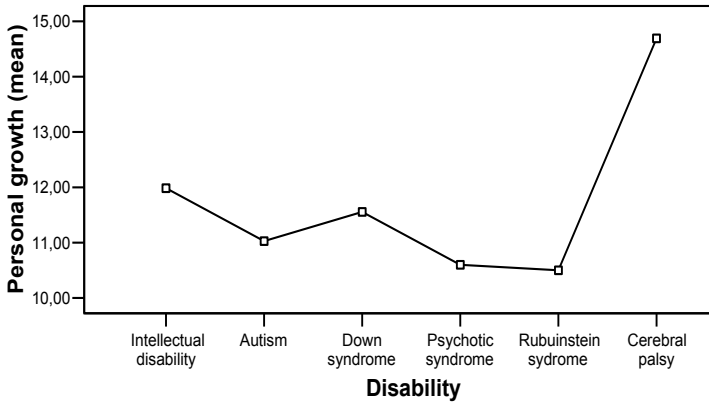


Table 3

	Sex	
	Males	Females
Personal growth (Mean)	12,40	10,98

Graph 3

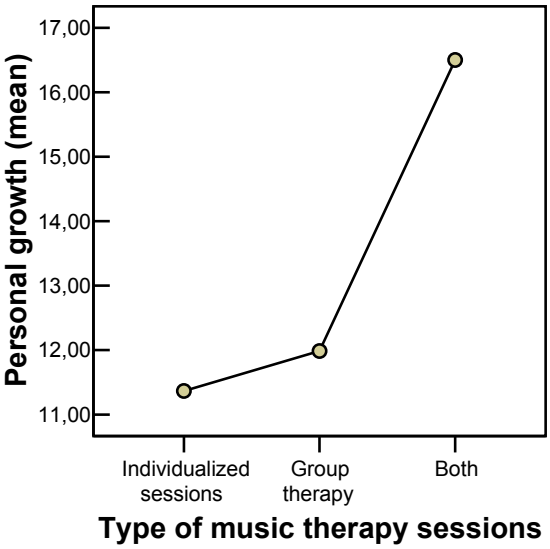
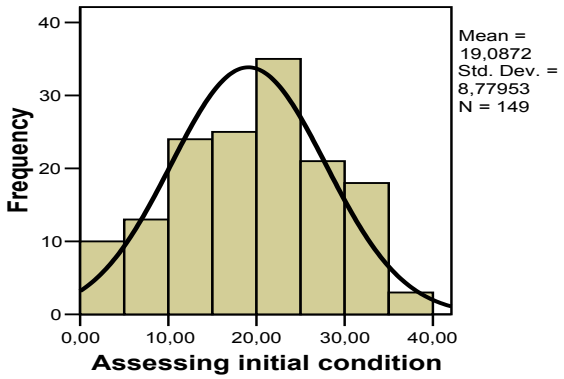


Table 4

		Personal growth (Mean)
Academic level (Father)	High school graduate	12,08
	Diploma	13,00
	Graduate	12,37
	Academic	9,91
Academic level (Mother)	High school graduate	13,06
	Diploma	11,87
	Graduate	11,77
	Academic	10,48

Graph 4



Graph 5

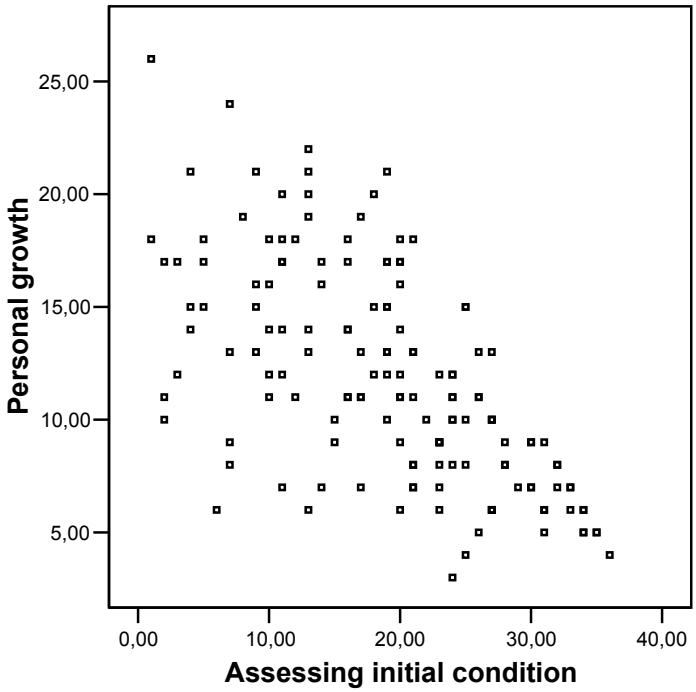
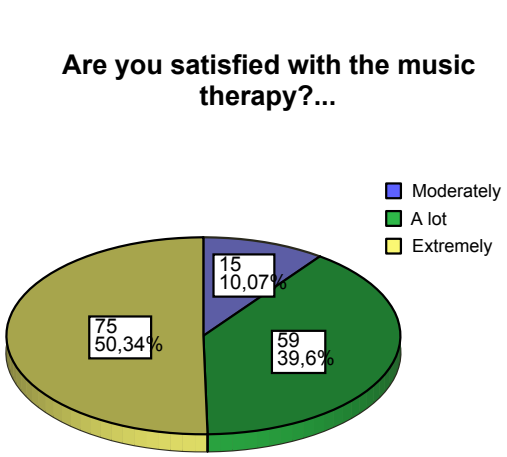


Table 5

	Therapies other than music therapy				
	None	Speech Therapy	Occupational Therapy	Psychotherapy	Speech Therapy & Occupational Therapy
Personal growth (Mean)	13,00	10,78	10,67	10,38	11,84

Graph 6



Graph 7

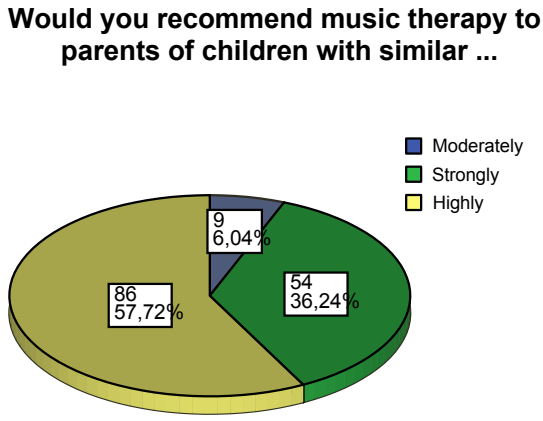


Table 6

	Are you satisfied with the music therapy?		
	Moderately	A lot	Extremely
Personal growth (Mean)	9,00	11,42	12,68

Table 7

	Would you recommend music therapy to parents of children with similar problems?		
	Moderately	Strongly	Highly
Personal growth (Mean)	8,89	11,39	12,38