Identifying Emotional Intelligence and Metacognitive Awareness among University Students

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ABSTRACT
The aim of this study was to research the attitude between emotional intelligence and metacognitive awareness in a group of university students. The participants were 178 students from the departments of the Psychology and Biology of Saint-Petersburg University. There were using questionnaire: EmIn Questionnaire by Lyusin D., Metacognitive Awareness Inventory (MAI) by Schraw G. & Dennison R.S. adapted in Russian by A. Karpov & I. Skityaeva, the Self-organization of Activity Questionnaire by E. Mandrikova, The differential reflectivity test by D.A. Leontiev and E. N. Osin. Means, standard deviations, regression, correlation, factor analysis were used to analyze the data. Results indicated a significant positive correlation between emotional intelligence (EI) subscales (“Interpersonal EI”, “Intrapersonal EI”, “Emotion Comprehension”, “Emotion Comprehension”) and metacognitive awareness. The results of multiple regression analysis using meta-cognition as predicted to subscale “Interpersonal EI” and “Systemic reflection”. These results mean that the Metacognitive knowledge and Metacognitive regulation is influenced by the ability to understand and control other people's emotions of the university students. The strength of the correlation indicates that a generally high level of metacognitive awareness is related to a high level of emotional intelligence.

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Keywords: meta-cognition, interpersonal emotional intelligence, reflectivity, self-organization of activity.

Introduction
Emotional Intelligence
Emotional intelligence (hereafter EI) is one of the most recently defined categories of intelligence in the field of psychology. The popularity of EI research relates to the concept of intelligence (IQ). Studies of intelligence show that high IQ level by itself could not ensure success in every aspect of life (Dulewicz & Higgs, 2000). This fact gives an opportunity for EI research. According to the literature, EI has become one of the major evaluation targets for an individual’s workplace.
outcomes including successes and failures. This has been especially valued in business over the past 20 years. American psychologists Salovey and Mayer were the pioneers in the study of EI (Hahn at all., 2013). They distinguished EI as the factor of ‘social intelligence’ which has been also defined as the ability to understand and manage people (Salovey & Mayer, 1990). Nowadays EI has different definitions in conceptualizing EI, which was analyzed by Gayathri and Meenakshi (2013). The most popular definition is how an individual manages his/her own emotions and the emotions of others. Gayathri and Meenakshi (2013) believed the concept of EI needs to be researched more thoroughly in order to repel the challenges to its efficacy as a concept. The authors addressed the need for simplified definitions and approaches used to correctly evaluate the emotional skill set of a person.

In this study, we use the definition, that EI is an ability for management and comprehension of one’s own and other’s emotions. Lusin (2006, 2014) describe EI, as cognitive ability and does not include it in a personal structure. Personality traits could influence emotional understanding, but personality traits are not the components of emotional understanding. EI includes Interpersonal EI, Intrapersonal EI, Emotion Comprehension, Emotion Management.

**MetaCognition**

The first appearance of the concept of metacognition and its entrance into the field of cognitive psychology was through the work of John Flavell at the beginning of the 1970s (Flavell, 1976). Metacognition is defined as an activity of monitoring and controlling one’s cognition (Yong & Fry, 2008). It can further be defined as what we know about our cognitive processes and how we use these processes in order to learn and remember (Ormrod, 2004). The main function of metacognition is the regulation of cognitive processes using knowledge of cognitive patterns. Researchers further conceptualize metacognition by breaking down metacognition into two subcomponents: metacognitive knowledge and metacognitive regulation (Weinert & Kluwe, 1987; Schraw & Dennison, 1994).

Metacognitive knowledge includes the reflexive understanding of the learning process and the role of the subject. There are three types of metacognitive knowledge: declarative, procedural and conditional (Schraw & Dennison, 1994; Schraw & Moshman, 1995). Schraw and Moshman describe declarative knowledge as “knowledge about things”, procedural knowledge as “know how to do things” and conditional knowledge as “knowledge about why and when to do something” (Schraw & Moshman, 1995). Metacognitive awareness (hereafter MA) is needed in order to have insight into metacognitive functioning at the conscious level (Duffy et al., 2015) The expression of insight during these life situations reinforces the metacognitive skill.

Kholodnaya identified three levels of mental experience: cognitive, metacognitive and intentional (Kholodnaya, 2012). According to her, MA is knowledge about self-intelligent and self-cognitive
resources, as a component of a self-determination potential. Rasshchepkina showed that MA is a component of the self-regulation system of self-determination, as well as a component of "metacognitive experience" (Rasshchepkina, 2015). Therefore, MA is an individual resource for self-regulation of actions and decisions.

Karpov defines metacognition as the leading form of the reflexive regulation of cognitive activity (Karpov, 2018). The author suggests that the main function of metacognition is self-regulation, and the main form of self-regulation is self-organization.

MA allows a person to plan, monitor and control the process of their own cognitive activities (Schraw & Dennison, 1994). MA is one of the key elements necessary for the development of student autonomy and independence. The results of the study showed the dependency between individual metacognitive processes with intelligence (IQ) and learning as well as the dependency between the level of development of intelligence (IQ) and the structural organization of metacognitive processes (Wilson & Bai, 2010; Kelly & Ku, 2010).

Statement of the Problem

Practical results of research into MA and EI could be useful in the optimization of learning activities. Individually, EI and metacognition have appeared in the general literature and have been described as a mature topic for over 40 years (Torraco, 2005). The studies of Shields (2010) and Wheatley (1999) explore the integrative relationship between EI and metacognition. The integrative, review of typology, in particular the synthesis of the literature, identifies a convincing argument to pursue the need for additional research into the influence of EI and metacognition. University students use metacognitive strategies and skills, which they gain in High School and form new ones (Ohtani & Hisasaka, 2018). By the end of their stay at University, students possess improved self-organization and learning skills, creativity, and practical activities. EI also relates to stress among students (Arora et al., 2011). Students of the medical university who achieved higher EI scores were found to experience higher stress during passing “unfamiliar surgical scenario-tasks” but were also more likely to be able to respond better after the surgical task was completed than their peers with lower EI (Arora et al., 2011).

Empirical studies have shown that the development of self-regulation and metacognitive abilities of students is one of the most significant factors affecting academic performance (Sellen et al., 1997). Students with the high level of MA are more successful in learning activities (Wilson & Bai, 2010), as well as in decision making in general because they are aware of effective learning strategies. Despite the enormous information that experience sampling methodology provides to us, not much is known about how individual differences in EI are reflected in MA. The study aimed at answering the following question: Is there a significant relationship between students’ EI and their metacognition?
Methods
Participants
The population of this study consisted of 178 students enrolled in Saint-Petersburg State University (SPbU), departments of the Psychology and Biology in the academic year 2017/2018, and represented the second level of study. A sample of 30 males and 148 females students were chosen from the population with an age range of 18-22 years.

Instruments
Four instruments were used in the study (A), (B), (C) and (D).

(A) The Russian EI questionnaire (EmIn) developed by Lyusin (2006)
It consists of 46 items with a 4-point Likert scale response format, ranging from “completely disagree” to “completely agree”. These items form four questionnaire scales: Interpersonal EI (e.g., “I understand other people’s inner states without words”); Intrapersonal EI (e.g., “I know what to do to improve my mood”); Emotion Comprehension (e.g., “Often, I can’t find the words to describe my feelings to my friends”); Emotion Management (e.g., “If I hurt somebody’s feelings, I don’t know how to restore a good relationship with them”); and Control of Expression (e.g., “I could control my emotional behavior”). The aggregate score of these scales provides the assessment of General EI. The Cronbach’s alphas of the Emln scales were reported to range from 0.84 to 0.89 (Lyusin & Ovsyannikova, 2015).

(B) Metacognitive Awareness Inventory (MAI) developed by Schraw and Dennison (1994) and adapted in Russian by Karpov and Skityaeva (2005)
The MAI consists of 52 items rated on a five-point Likert scale. Both components of metacognition (metacognitive knowledge and metacognitive regulation) are represented. There is only an MAI total score of metacognitive awareness in the Russian variant of inventory. Higher scores correspond to greater metacognitive knowledge and regulation.
The Self-Organization of Activity Questionnaire developed by Mandrikova with the Purposefulness Index and Rationality Index (Mandrikova, 2007)
The scale is used for diagnosing the maturity of tactical planning and strategic goal-setting skills. The questionnaire was made on the basis of the Time Structure Questionnaire TSQ (Bond & Feather, 1988; Feather & Bond, 1983). There are questionnaire scales: “Presence of Purpose”,

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"Persistence" scales, "Planning", "Fixation", "Purposefulness", "Self-Organization" scales and the total score of Self-Organization of Activity. The Self-Organization of Activity Questionnaire consists of 25 items rated on a seven-point Likert scale.

(C) Differential reflexivity test (DTR) constructed by Leontiev and Osin (2014)

This includes a 30-item questionnaire using a 4-point response scale, operationalizing Leontiev’s 3-component model of reflexive processes. According to the model, systemic reflection (a tendency to look at oneself within the context of situations and life in general) is a productive form of reflection conducive to dialogue with the world. DTR includes three scales: systemic reflection; introspection; and quasi-reflection.

In this prospective study, these concepts were examined as integrated concepts of research of integration between EI and metacognition. All quantitative data were analyzed using IBM SPSS Statistics for Windows, version 19.

Procedures
The instruments were presented to the participants in their regular classrooms by the researchers who explained the purpose and procedures involved and assured the participants of anonymity, stressing the confidentiality of their responses, which would be used solely for research purposes. The question booklets were distributed and participants instructed in how to complete them. On completion, the participants’ responses were scored by the researchers and entered into the computer for statistical analysis.

Results
At the first stage of the study, we calculated mean values of EI, metacognition, self-organization of activity and reflexivity. Good scores obtained from all sub-scales of EI, including the metacognition scale, the self-organization of activity and differential reflexivity.

Table 1. Descriptive Statistics of parameters of EI, metacognition, self-organization of activity and reflexivity (n=178)

<table>
<thead>
<tr>
<th>Instruments</th>
<th>Parameters</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eln</td>
<td>Interpersonal EI</td>
<td>45.82</td>
<td>10.58</td>
</tr>
<tr>
<td></td>
<td>Intrapersonal EI</td>
<td>38.01</td>
<td>8.98</td>
</tr>
<tr>
<td></td>
<td>Systemic reflection</td>
<td>Quasi-reflection</td>
<td>Purposefulness</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------</td>
<td>------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Intrapersonal EI</td>
<td>0,218**</td>
<td>-0,172*</td>
<td>0,221**</td>
</tr>
<tr>
<td>Total score</td>
<td>17,52</td>
<td>5,45</td>
<td>30,06</td>
</tr>
</tbody>
</table>


To explore the relationship between EI, metacognition, self-organization of activity and reflexivity, the correlation coefficients (Pearson’s rank) were calculated and demonstrated in Table 2.

Table 2. Correlation between EI, metacognition self-organization of activity and reflexivity (n=178)
Table 2 shows that all components of EI (intrapersonal EI, interpersonal EI, emotion comprehension, emotion Management) are positively related to the reflection, purposefulness and MA (p≤0.005) and negatively related to the quasi-reflection (p<0.05).

Table 3 shows the results of multiple regression analysis using metacognition as predicted to EI.

<table>
<thead>
<tr>
<th>Metacognition</th>
<th>EI, self-organization of activity and reflexivity</th>
<th>R</th>
<th>R²</th>
<th>F</th>
<th>β</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA</td>
<td>Interpersonal EI of</td>
<td>0,422</td>
<td>0,178</td>
<td>4,277</td>
<td>0,284</td>
<td>4,002</td>
</tr>
<tr>
<td></td>
<td>Quasi-reflection of</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Systemic reflection</td>
<td></td>
<td></td>
<td></td>
<td>0,148</td>
<td>2,068</td>
</tr>
</tbody>
</table>

The results given in table 3 showed that the interpersonal EI, quasi-reflection and systemic reflection were significant predictors of MA (R²=0.175, F=4.277, p=0.05). These results were supported by the close moderate correlation between the third variables (r=0.671). Approximately 17.8% of the variance of the student’s emotional knowledge was accounted for by metacognition.

Table 4. Factor analysis: rotated factor matrix

<table>
<thead>
<tr>
<th>Factors</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotion Management</td>
<td>0,872</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotion Comprehension</td>
<td>0,825</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpersonal EI</td>
<td>0,775</td>
<td>0,554</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intrapersonal EI</td>
<td>0,772</td>
<td>-0,441</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metacognitive Awareness</td>
<td>0,440</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total score of Self-Organization of Activity</td>
<td>0,812</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Factor analysis led to the identification of some latent variables (factors) which explain the links between the questionnaires. After a varimax rotation, the 3 extended factors can be labeled as follows: emotional self-control and self-awareness; self-organization of activity; interpersonal EI, reflexivity.

The first-factor includes the scale of EI, MA, and scale of self-organization of activity ("Purposefulness"). The second factor refers to scales of Self-Organization of Activity: "Total score of Self-Organization of Activity", "Planning", "Fixation", "Purposefulness", "Self-Organization". The third factor is a binary scale "Interpersonal EI" — "Intrapersonal EI". Finally, scales of Differential reflexivity test have formed factor Reflexivity.

**Discussion**

The concept of metacognition was introduced by Flavell in 1976 and his definitions of the main elements of the concept are still in use (Kelly & Ku, 2010; Martinez & Davalos, 2016; Mahasneh 2014). Data about the relationship between metacognition and emotion are unfortunately limited and focused almost exclusively on psychopathology and medicine (Matthews & Wells, 2004; Wells, 2000; Weng et al., 2011). The primary aim of this research was to investigate the interconnection between EI and metacognition of university students. The results indicated that all EI components are related positively to MA. Results of our study mean that a generally higher level of MA, systemic reflection and purposefulness are related to a higher level of EI. The process by which an individual manages his/her own emotions and the emotions of others is often accompanied by a host of additional or second order thoughts relevant for perceiving, metacognition and self-organization. A higher level of quasi-reflection is associated with lower levels of EI.
Metacognition thoughts can play an important role in understanding psychological processes relevant to EI. Our findings matched up with other results (Alavinia & Mollahossein, 2012) which found a positive relationship between learners’ EI and their use of metacognitive strategies. Sharei et al (2012) found that metacognition and EI contribute significantly to the prediction of problem-solving ability. Our results are comparable with Pluzhnikov’s theoretical conception which describes EI like a metacognitive ability: “EI is a special metacognitive ability, which consists of a hierarchy of organized abilities of perception, understanding, and regulation of emotions in different life situations” (Pluzhnikov, 2010).

The indicator of MA revealed a connection with the scales of self-organization of activity, which could mean that MA has a function which reflects its role in the target self-regulation. Understanding one’s own goals and setting them in accordance with the available opportunities helps one to achieve results (Perikova & Bysova, 2018).

Conclusion
Results of our study mean that the regulation, monitoring, and control of cognitive activities are influenced by the EI of university students.

From a theoretical standpoint, the following line of research is suggested for the future: (a) The university needs to intensify its role in increasing the effectiveness of students’ metacognition skills through training programs. (b) The researchers are recommended to conduct further studies in a different university.

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References


