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# Metamotivation in medical students: Explaining motivation regulation strategies in medical students

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## Abstract:

**BACKGROUND:** Metamotivation is a process that students use to monitor their motivational states to reach their academic goals. To date, few studies have addressed the ways that medical students manage their motivational states. This study aim to identify the motivational strategies of medical students as they use the metamotivational process to monitor and control their motivational states.

**MATERIALS AND METHODS:** This qualitative study uses directed content analysis of the narrative responses of 18 medical students to draft an in-depth and semistructured interview protocol which were conducted through WhatsApp due to social distance restrictions of COVID-19. Data were collected, encoded, and analyzed using deductive content analysis approach described by Elo and Kyngäs.

**RESULTS:** Seven main themes were extracted as the motivational strategies of medical students including “regulation of value,” “regulation of situational interest,” “self-consequating,” “environmental structuring,” “efficacy management,” “regulation of relatedness,” and “regulation of situational awareness.” In this study by identifying new strategies, we provide a broader framework of metamotivational strategies in the field of the progression of learners in medical education.

**CONCLUSION:** Medical students use a variety of strategies to regulate their academic motivation. To sustain and improve the motivation of medical students, identifying and strengthening metamotivational strategies is the first step.

## Keywords:

Education, emotional regulation, medical, motivation, qualitative research, metamotivation

## Introduction

Motivation is always mentioned as one of the most important components of learning.<sup>[1]</sup> Based on scientific findings, the quality of medical students’ motivation reduces dramatically during the course of their study.<sup>[2,3]</sup> To deal with this challenge, educators have proposed solutions such as optimizing the learning environment and utilizing active teaching and learning strategies that promote autonomous motivation of learning.<sup>[2,4-7]</sup> Although studies have shown that an autonomy-supportive teaching style in the classroom improves

student motivation, relying solely on teaching strategies is not only a simplistic approach but also insufficient for maintaining and promoting students’ motivation since there are barriers that are beyond teacher’s control hindering student motivation.<sup>[8]</sup>

Although the literature on the role of motivation as a dependent variable in the field of medical education is rich, the active role of the student in monitoring and controlling this variable has received less attention.<sup>[9-11]</sup> According to Lyons *et al.*, educators can improve medical students motivation by modelling and teaching motivation regulation strategies.<sup>[12]</sup> Wolters

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describes motivation regulation as a deliberate and purposeful process by the learner.<sup>[13]</sup> Therefore, learners engaged in this process not only are aware of the factors that influence their motivation but also form their motivation through manipulation of their thoughts and actions.<sup>[14-16]</sup> Wolters has identified several motivational regulation strategies in his studies.<sup>[13,15]</sup> These strategies include regulation of value, self-consequating, regulation of situational interest, regulation of performance goals, regulation of mastery goals, and environmental structuring.<sup>[17]</sup>

Miele and Scholer questioned the comprehensiveness of Wolter's motivational regulation strategies.<sup>[18]</sup> According to their research, these strategies did not represent a precise list of steps students take to regulate their motivation in real situations.<sup>[18]</sup> They have presented a comprehensive model that describes the monitoring processes of motivation by learners and used the term "Metamotivation" to describe this process.<sup>[8,9,18,19]</sup> Although their model is well defined, they emphasized to identify more comprehensive metamotivational strategies.<sup>[8,18]</sup>

According to Silva *et al.*, medical students experience significant changes in their motivation in each phase of their study.<sup>[2]</sup> Over time, medical students are likely to use a variety of motivational regulation strategies to monitor and maintain their motivation. Therefore, we suggest that these strategies would be different in the context of medical education and require a different approach for investigation. To the best of our knowledge, there is no qualitative research found in the literature that explain motivation regulation strategies in real situations. Moreover, there is a need to explain more comprehensive strategies in the context of medical education since promoting motivational regulation strategies is particularly salient to monitor medical students' quality and quantity of motivation. Therefore, this study aims to identify the motivational strategies of medical students as they use the metamotivational process to monitor and control their motivational states.

## Materials and Methods

### Study design and setting

This study was conducted as a qualitative research and the direct content analysis approach<sup>[20]</sup> to explore Wolters' motivation regulation framework when applied to the context of medical education. Data were collected, encoded, and analyzed using deductive content analysis approach described by Elo and Kyngäs.<sup>[21]</sup>

Tehran and Zanjan University of Medical Sciences were selected as investigation sites. TUMS and ZUMS are public universities in Iran, and their MD curricula are system based consisting of 7 years of study through

four phases: basic science (2 years), physiopathology and semiology (1 year), clerkship (2.5 years), and internship (1.5 years).

### Study participants and sampling

Participants in the study were medical students selected from four academic phases by purposive sampling. Medical students who had a wealth of experience in clinical setting had priorities in interview because they could provide particular knowledge and insight on motivation regulation strategies. After consulting with the student engagement unit of the Education Development Office, school of medicine, motivated students, as these would be the people successfully using metamotivation strategies, were identified. The criteria for selecting students were: The students who showed interest and enjoyment in learning, had constant effort and perseverance in learning, behaved professionally in the educational environment and students who were introduced as role models for other students.

The interviews continued until the data were saturated by 18 interviews with nine males and nine females. Inclusion criteria were being medical student of Tehran and Zanjan University of medical sciences and able to provide informed consent. Exclusion criteria were not adhere to the study, or withdraw from the study at any stage.

### Data collection tool and technique

In-depth and semistructured interviews were conducted for data collection. Due to the COVID-19 pandemic, all interviews were carried out virtually using the WhatsApp application and the interviews were audio-recorded. The average duration of the interviews was 60 min. In all interviews, participants were asked to describe previous real academic situations and the "ups and downs" of their motivations as medical students. The researchers tried to identify each strategy when it is used deliberately and purposefully and in line with students' academic motivation and performance. Based on each participant's responses, the interviewer probed their reflections on how they control and monitor their motivations in different situations.

After each interview, the recorded data were transcribed and imported into the MAXQDA 2018 (VERBI Software, 2017).<sup>[22]</sup> Because of direct content analysis approach, the six Wolters' strategies were determined as predefined themes. The principal investigator (PI) coded the sentences and the content of the interview. The codes for these six strategies were divided into these themes and the codes that did not fit into predefined themes were categorized into new themes. The Guba and Lincoln criteria were used to ensure of

rigourness of the study.<sup>[23,24]</sup> To ensure credibility, the PI was continuously involved in the research topic for 8 consecutive months and used the methods of bracketing and member check. One expert out of the research team reviewed the analyses to ensure confirmability. To ensure data dependability, 10% of the data were encoded by two independent individuals. Furthermore, to achieve transferability, maximum variation was considered in sampling in terms of gender and phase of education.

### Ethical consideration

The approval of the study was obtained from the Ethics Committee at TUMS (Ethics Code: IR.TUMS.MEDICINE.REC.1398.818). Subjects who selected to participate in the study were informed orally by the PI about the purpose and process of the study. After orally agreeing to participate, a link to the code of ethics, participants' rights, and an informed consent form was sent to the participants via WhatsApp Messenger. The students read the forms and sent their written consent to the PI. Furthermore, at the beginning of each interview, the objectives of the study and the participants' rights were read again, and the participants verbally announced their informed consent.

## Results

Eighteen medical students with an average age of  $23.8 \pm 2.0$  years were interviewed; all were single. Table 1 displays the characteristics of the participants.

A total of 862 initial codes were extracted from preliminary analyses. Details of these extracts and representative quotes are listed in Appendix 1. After classifying the codes, sub-themes were identified within the 7 main themes [Figure 1]. Each main theme is described in the following section.

### Regulation of value

*Regulation of lessons values*

In this case, the student tries to point out the importance of his/her lessons and homework by thinking about the use of educational content and skills in his/her future academic, career, or professional work.

### Regulation of activities values

Which presents itself as a priority between learning experiences.

*"For example, when I have to read a complex and even arcane theoretical section in physiology, for example, I find relevant clinical cases and try to make the connections to keep myself interested."* p14

### Regulation of situational interest

*Connecting the educational contents to personal interests*

Such as doing extra work related to the subject.

### Making educational situations more fun

Such as creating intimacy between other students or other staff in the educational environment.

*"I remember, for example, being stumped by having to memorize biochemical pathways during my 1<sup>st</sup> and 2<sup>nd</sup> year. I made a game with them as a way to learn them and it became fun."* p09

### Self-consequating

*Make a promise in themselves*

In this strategy, students adopt some rewards for themselves for achieving academic tasks.

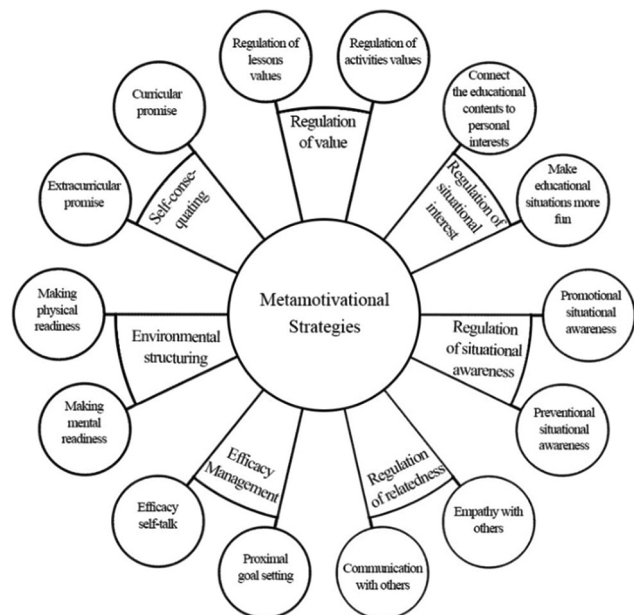


Figure 1: Seven metamotivational strategies used by medical students and their sub-themes

Table 1: Characteristics of study participants

| Phases                        | Participants, n (%) | Gender        |             | Age average | GPA      |
|-------------------------------|---------------------|---------------|-------------|-------------|----------|
|                               |                     | Female, n (%) | Male, n (%) |             |          |
| Basic science                 | 2 (11.1)            | 1 (50)        | 1 (50)      | 20.5±0.7    | 16.3±1.3 |
| Physiopathology and semiology | 3 (16.6)            | 2 (66)        | 1 (33)      | 22.3±1.7    | 17.1±1.4 |
| Clinical training             | 5 (27.7)            | 2 (40)        | 3 (60)      | 23.4±1.6    | 15.9±1.4 |
| Internship                    | 8 (44.4)            | 4 (50)        | 4 (50)      | 25.5±1.7    | 16.5±1.2 |
| Total                         | 18 (100)            | 9 (50)        | 9 (50)      | 23.8±2.0    | 16.4±1.3 |

GPA=Grade point average



### *Make a promise in others*

Students try to involve themselves in an obligation by promising a favorite person trying to keep motivation attempting to fulfill that obligation.

*"I promised myself, if I got a high score, I'd do something fun with my friends like going to the cinema, a club,...."* p04

### **Environmental structuring**

#### *Making physical readiness*

The focus is on modifying and adapting the physical learning environment to their personal characteristics.

#### *Making mental readiness*

Similarly, the student determines activities to reduce personal anxiety or mental fatigue as a way to conserve motivation for the hard tasks.

*"I try to distance myself from people who are too discouraging, as you say, and even if, for example, they have a close relationship with me, I will try not to have anything to do with them."* p16

### **Efficacy management**

#### *Efficacy self-talk*

The student reminds himself/herself about his/her strengths and standards for performance.

#### *Proximal goal setting*

The students divide a complex educational activity into smaller and simpler parts based on their skills and take action to implement it step by step.

*"For example, I failed the first Epidemiology quiz because I really wasn't prepared. I'm stronger than this, I know better. I do not want a low score in any course. So, I put real effort into it and did well."* p11

### **Regulation of relatedness**

#### *Communication with others*

Talking and consulting with trusted people and getting academic advice from them is a solution used by medical students.

#### *Empathizing with others*

In this case, the medical student identifies patients, friends, and students who are experiencing motivational problems, and by creating empathy they try to maintain their motivation.

*"I admired Dr. X when he was a student and he was accepted into .... Heart specialty training. Talking to him about how he did it and learning why it was important to work so hard inspired me to be like him."* p05

### **Regulation of situational awareness**

In this strategy, two opposing approaches are observed.

### *Promotional situational awareness*

Students consciously analyze their academic position in such a way that, by knowing the results, they open the door to academic advancements and achievements. The goal of using this approach is to progress toward being a good student, a good doctor, and making progress. Such students try to think of their mastery goals (mastery self-talk), seek feedback from previous academic performance, and seek role models or successful individuals to identify the positive characteristics that they wish for themselves. "Reflection" on past accomplishments or shortcomings provides an inspiring perspective for some students.

*"For example, if I review my previous good grades or the parts of the class that I understood well, I'll get more energy and motivation. I say go ahead and I think it works well for me. You made a mistake here! Fix it! Go another way! It is better to strengthen this ability! If you fail there, you may get the answer by simply changing your method."* p15

### *Preventional situational awareness*

In this approach, medical students consciously analyze their academic status so that they are aware of the results to deal with their homework, assignments, and responsibilities. The goal of this strategy is to prevent the student from getting worse, becoming a worse doctor, or degrading. In these approaches, unlike the previous ones, the students try to use performance self-talk, comparing oneself to another, and identifying negative role models to avoid adopting or having the negative characteristics of the person.

*"I am very motivated, not by a normal role model, but by a counter-role model. For example, I see the behavior of a doctor in a clinic and the treatment of a patient is not at all appropriate for the patient. I tell myself that I don't want to be like this doctor. I have to work on myself."* p12

Becoming aware of the future academic position is another way in this approach. Also, medical students collect information about the educational situation they will face shortly. This information helps them to enter that phase with prior preparation and to prevent any action that can lead to a decrease in the grades or reprimand by professors.

## **Discussion**

The aim of this study is to explain the metamotivational strategies that medical students use to control and monitor their motivation. In this regard, we have identified strategies that extend the conceptual framework and validate those proposed by Wolters. Also, we discovered and explored other motivational strategies that appear in the medical education context:

Efficacy management, regulation of relatedness, and regulation of situational awareness.

Consistent with previous findings, we found the “regulation of value” as the actions that a medical student takes to increase the value or importance of their academic status.<sup>[15,25-27]</sup> This strategy is considered equivalent to the “enhancement of personal significance” in Schwinger *et al.* study.<sup>[25]</sup> Ling also referred to the “task value enhancement strategy,” in which learners identify their key skills for future development.<sup>[16]</sup>

Consistent with previous findings, the results of our study showed that medical students try to use “regulation of situational interest” strategy to improve their academic motivation.<sup>[16,26,28]</sup> Schwinger *et al.* chose the title “enhancement of situational interest” for this strategy.<sup>[25]</sup> Teng showed that students try to relate their learning to their personal interests in order to maintain or increase their motivation.<sup>[28]</sup> Ling referred to “interest enhancement strategy” in which, students control their academic motivation by making connections between learning and personal interests or interesting things in life.<sup>[16]</sup>

The next strategy was “self-consequating” which includes rewards for successfully completing homework and thereby increases the chances of doing it again.<sup>[29]</sup> Wolters described self-consequating as a prototypical way to regulate students’ motivation,<sup>[13]</sup> and Schwinger *et al.* sees this strategy as a kind of behavioral reinforcement through which one can motivate himself/herself by self-reinforcement to achieve a specific goal.<sup>[25]</sup> Ling also referred to the “self-reward strategy” and showed that students generally reward themselves to achieve their goals.<sup>[16]</sup>

The next strategy was “environmental structuring.” Schwinger *et al.* referred to this strategy as “environmental control” in his study.<sup>[25]</sup> In line with the results of this study, Wolters argues that in this strategy, learners change the environment to avoid disruptive factors and maintain their focus on homework, and in this way manage their physical and mental readiness.<sup>[13]</sup> An important point in environmental structuring is the inherent difference in its performance compared to other strategies. Medical students try to monitor and increase their academic motivation by using other strategies. But in this strategy, they try to control the disruptive factors that affect motivation.

Another strategy that is considered in this study was “efficacy management.” Although Wolters in a theoretical review considered efficacy management and proximal goal setting as a possible motivational regulation strategies in 2003, he refrained from including

these strategies in his final list.<sup>[26]</sup> Because he concluded that a small percentage of students use efficacy self-talk<sup>[15]</sup> and the scientific evidence for the link between efficacy self-talk and motivation and performance is unclear.<sup>[13]</sup> Wolters believes that proximal goal setting may not be a purposeful process and that students are not actively pursuing it. However, Schwinger *et al.* in his study referred to proximal goal setting as a motivational regulation strategy separately.<sup>[25]</sup> In all respects, we concluded that efficacy management is probably one of the motivational regulation strategies in medical students.

In the “regulation of relatedness” strategy, medical students consciously communicate with significant others to control their academic motivation. Although, Wolters and Schwinger did not explicitly mention this strategy, implicit references can be found in the literature. Wolters, For instance, mentioned the “emotion regulation strategy” in his theoretical review.<sup>[13]</sup> In this strategy, students may consciously control their excitement by seeing and talking to their friends in order to maintain their efforts for study.<sup>[13]</sup> Umemoto also mentioned “cooperative strategies” in his study in which students collaborate, study, and meet with friends to regulate their motivation.<sup>[30]</sup> The need for relatedness with significant others is particularly important in medical education<sup>[31]</sup> therefore, it seems that this strategy is very noticeable in the context of medical education.

The next strategy is the “regulation of situational awareness.” The literature reveals that Wolters used the two strategies of “regulation of mastery goals” and “regulation of performance goals” in his study for two different types of strategies.<sup>[26]</sup> In Wolters’ point of view, the regulation of mastery goals includes students’ beliefs about trying to learn, understand, and enhance their abilities. On the other hand, regulation of performance goals includes emphasizing the personal importance of doing things and getting good grades.<sup>[26]</sup>

It should be noted that mastery and performance goals are cognitive representations of tasks/outcomes which are obtained after monitoring student’s motivation. When we call “regulation of goals” as a strategy, it is like asking a student: How do you regulate your motivation to achieve goals? and she answers: by regulating my goals. In other words, the student tries to regulate her goals to achieve her goals! In our study, we considered a broader framework for this strategy to address this confusion. We believe that “reminding” and “thinking” to mastery and performance goals are only part of the strategies that medical students use to regulate their situational awareness. As mentioned earlier, medical students in regulation of situational awareness, remind themselves of mastery /performance goals, examine the

results of academic performance compared to himself/ others, identify positive/negative role models, and reflect on past/future accomplishments. These results were relatively consistent with the findings of Ling's study. In his study, "academic achievement enhancement strategy" means learners' activities to acquire knowledge, achieve high scores, or strengthen their ability, and improving their academic performance.<sup>[16]</sup> This strategy is almost equivalent to promotional situational awareness. Also, in "peer competitive stimulation strategy" students are worried about falling behind, try to compare themselves with their best classmates, or compete for jobs together in the future and use peer competition as a motivation to learn.<sup>[16]</sup> This strategy seems to be equivalent to preventional situational awareness.

### Limitation and recommendation

limitations of this study are the sample size and that it was conducted in a single country, though with two different medical school populations. Both limit generalizability, the first because of a relatively small number of subjects, and the second because of the cultural influences that may be specific to the country. Strengths include the use of an in-depth interview approach that captured student reflections, memories, attitudes, and emotions derived from their current and recent experiences, and explored in-depth with questions focused on motivational elements; the students were in a similar age group (young adult) and were selected from different years/phases of their education as medical students.

In current study, promotional and preventional situational awareness were introduced as a more comprehensive conceptual framework than regulation of mastery and performance goals, in which students use effective techniques such as reflection, feedback seeking, self-talk, and role modeling to regulate their academic motivation. The usefulness of these techniques has been proven many times in the medical education literature.<sup>[32,33]</sup> Therefore, it is suggested that in future studies, the effect of regulation of situational awareness on motivational components be specifically examined.

### Conclusions

The result of this study is to pay attention to the role of the medical student himself in controlling, monitoring and promoting academic motivation. As mentioned before, most studies in the field of medical education have addressed the effective role of the educational environment in promoting the motivation of medical students. It should be noted that motivation is essentially a complex, not linear, phenomenon and numerous factors affect it. Thus, if we look at motivation as a dynamic phenomenon, a network of interrelated factors

leads to the emergence of a motivational state in the individual. According to complexity theory, a small change in one part of this interactive network can lead to a great change in another part. With this view on motivation, two important results can be achieved: First, in order to promote students' academic motivation, all factors affecting it must be considered, and ignoring or underestimating the impact of some factors (such as the student himself) is a strategic mistake. Secondly, although the number of factors affecting students' motivation is very high and even manipulating and modifying many of them is beyond the access of those in charge of education affairs, this issue should not disappoint us in trying to promote students' motivation. Because in complex phenomena, by applying timely and even small interventions, a significant effect can be observed. This small change or intervention may be the use of metamotivational strategies by the student himself.

This study shows that medical students use a variety of strategies to regulate their motivation during their studies. These strategies have considerable overlap with the strategies previously introduced by Wolters, Schwinger, and others. In addition, we discovered and explored other motivational strategies including efficacy management, regulation of relatedness, and regulation of situational awareness. Future research may use more complex statistical methods, such as structural equation modeling, to investigate the causal relationships of metamotivational strategies with motivational components in medical education.

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### Conflicts of interest

There are no conflicts of interest.

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## Appendix

### Appendix 1: Main themes, sub-themes, number of extracts and representative quotes

| Main themes                         | Sub-themes  | Number of extracts | Representative quotes  |
|-------------------------------------|---|--------------------|--|
| Regulation of value                 | Regulation of lessons values                              | 102                | <i>"When I started studying these subjects, for example, anatomy, I thought, Well, I have to learn anatomy because if I want to study in a clinical surgery course, I have to be familiar with it, so I'd better take my time now and learn it wonderfully"</i> p15                                  |
|                                     | Regulation of activities values                           | 18                 | <i>"In the clinical training phase, when I felt the issue was very important, maybe I would stay (in the hospital) 4 hours longer. I would tell myself that the training of these 2 weeks will not be repeated anywhere else"</i> p10  |
| Regulation of situational interest  | Connecting the educational contents to personal interests | 90                 | <i>"There were several issues that helped me a lot to maintain my motivation better than my classmates. I was interested in research and writing papers, so I tried to tie my lessons to these activities"</i> p13   |
|                                     | Making educational situations more fun                    | 77                 | <i>"I've always tried to look at all of them (educational resources) to see which ones are most appealing to me to read. Which is more intimately written, or which book is more enjoyable for me"</i> p03   |
| Self-consequating                   | Make a promise in themselves                              | 9                  | <i>"I expected to experience better days, I knew that if I could pass a semester successfully, I would be rewarded with more interesting lessons and educational opportunities. This covenant strengthened my motivation"</i> p08  |
|                                     | Make a promise in others                                  | 27                 | <i>"I called my friend and said: If I finish the book by nightfall, we will go to a restaurant together. I was doing this intentionally. Because I knew I had to finish reading the book because of being with my friend"</i> p01  |
| Environmental structuring           | Reaching physical readiness                               | 58                 | <i>"The university of basic sciences is at the front entrance. I usually go to the nearby cafeteria since the people there usually know me and I feel welcome. It is also a beautiful place and I read and study well for my basic sciences and physiotherapy exams, there is a library too"</i> p16 |
|                                     | Reaching mental readiness                                 | 87                 | <i>"Well, after a busy week full of exams, it was not a bad thing (traveling). Anyway, it helped my mind rest a little a recover for the next course"</i> p06  |
| Efficacy management                 | Efficacy self-talk  | 10                 | <i>"I try to be able to manage clinical courses. When I feel I have mastered clinical competencies, I automatically become more motivated"</i> p13   |
|                                     | Proximal goal setting                                     | 9                  | <i>"When I read a very difficult lesson, I try to divide it into sections and I set a timeframe for each section. This schedule makes it easier for me to deal with the lesson"</i> p02  |
| Regulation of relatedness           | Communication with others                                 | 132                | <i>"Most of the time, I talk to my professors, especially Dr. X. it gives me encouragement and it strengthens my motivations"</i> p15  |
|                                     | Empathy with others                                       | 15                 | <i>"I try to help my classmates. This way, I actively tell them that if you need an ear, both my ears are at your service. This motivates me"</i> p10  |
| Regulation of situational awareness | Promotional situational awareness                         | 136                | <i>"I remember, when I did my job perfectly, for example when I would take medical history, I would go to my professor to get their positive feedback"</i> p16   |
|                                     | Preventional situational awareness                        | 92                 | <i>"I felt more motivated when I found that my analysis was better than that of the others"</i> p13  |