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THE SYLLOGISTIC REASONING ABILITY IN ITS RELATIONSHIP WITH THE PREFERRED EMOTION REGULATION GOALS

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Abstract. *The proposed paper initiates, at an exploratory level, the investigation of the relationship between the level of autonomy of the emotion regulation goals (measured with the scales of the Self-Regulation of Withholding Negative Emotions – SRWNE -, an instrument elaborated by Kim, Deci, and Zuckerman, in 2002) and the syllogistic reasoning processes (examined through a syllogistic task with two versions, with a different linguistic format, which presumably favor different reasoning processes: the M format, supposedly favoring the inference based on automatic recognition of learned syllogistic schemata, and the E format, presumably favoring general, harder, deliberate analytic processes). A total number of 91 first year students at the University of Fine Arts and Design from Cluj-Napoca (mean age: 20 years, 68 females, 20 males, 3 without a specified gender) participated at the study. The sample was randomly separated in two relatively equal groups, based on the administration order of the two versions of the syllogistic task. The results of the research indicate that the autonomy, as a social aspect of one's functioning, may play a role in the link between the way people set their emotion regulation goals and the way they think deductively. More specifically, there were obtained, mostly, statistically significant or marginally significant positive correlations between the preference for the integrated (autonomous) emotion regulation goals and the performance for the valid syllogisms (and, correlatively, negative correlations between the performance for them and the preference for the externally controlled emotion regulation goals), particularly for the one-model ones and in the M version of the syllogistic task. The general pattern of the results in what respects the association between the performance for the invalid syllogisms and the preference for the investigated types of emotion regulation goals had similarities with the one obtained for the case of the valid syllogisms, but there were also important differences between them. The variation of the investigated correlations based on the considered type of syllogisms, on their linguistic format, or on the administration order of the two versions of the syllogistic task suggests that the studied relationship might not be explained solely based on some general thinking abilities, i.e. that more specific factors, related with the two versions of the syllogistic task, may be involved in that relationship (e.g., one's argumentative*

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experience, presumably associated with the autonomous choice of her/his goals). At the same time, the above-mentioned variation is important for a better understanding of the syllogistic reasoning, supporting the idea that different deductive processes may be usually implicated in the correct solving of the multiple-model valid syllogisms than the processes implicated in the correct solving of the multiple-model invalid ones, because the pattern of the correlations between the performance for them and the preference for the investigated emotion regulation goals was not the same (a result that contradicts the prediction of the mental model theory for the syllogistic reasoning that there should be no difference between the two types of multiple-model syllogisms regarding their solving and its relation with one's argumentative experience, or personal autonomy).

Keywords: *syllogism, deductive reasoning, emotion regulation goal, autonomy, mental model theory of syllogisms*

THEORETICAL FRAMEWORK

The relationship between the thinking abilities and emotion regulation (in this study, emotion will be used as a generic term for all kinds of affective states and moods) is not clearly defined, this research theme being theoretically and, especially, empirically tackled only in a tangential or implicit manner. This state of affairs holds true especially in what regards the link between the deductive reasoning ability, which is part and parcel of the foundation of the thinking abilities, and the emotion regulation process. Although it is admitted that one's emotion regulation can be affected by some reasoning errors (in general implicitly in the research dedicated to the cognitive psychotherapy; e.g., Jolley et al., 2014; Rachman, 1983), and that some psychopathological states (characterized by emotional dysregulation) may affect the reasoning processes (e.g., Channon & Baker, 1994; Hartlage, Alloy, Vázquez, & Dykman, 1993; Stevens, Holmberg, Lovejoy & Pittman, 2013; Silberman, Weingartner & Post, 1983; Simpson, Cove, Fineberg, Msetfi & Ball, 2007; Von Hecker, Sedek & Brzezicka, 2013), the dynamical relationship between the deductive reasoning and emotion regulation is a topic that has been investigated directly, explicitly, only recently, with only a few studies existing to date in this respect. It is foreseeable a bidirectional relationship: on the one hand, deductive reasoning ability may influence the type of emotion regulation (some of the emotion regulation strategies that are of a cognitive type might be dependent on individual differences regarding the functionality of the reasoning processes, especially taking into account the fact that emotion regulation can be interpreted to be a problem, requiring cognitive resources similar to those involved in solving any other problem, those resources including inferential processes), and, on the other hand, one's emotional state, as a result of an emotion regulation process, may influence the accuracy and efficiency of the deductive reasoning processes. The first empirical investigations in this research domain have been carried out predominantly in the latter direction of the above-mentioned relationship between the reasoning processes and the results of the emotion regulation (Berle & Moulds, 2014;

Blanchette, 2006; Blanchette & Campbell, 2012; Blanchette, Caparos, S. & Trémolière, 2017; Blanchette & Leese, 2010; Blanchette, Richards, Melnyk & Lavda, 2007; Goel & Dolan, 2003; Houdé & Borst, 2015; Houdé et al., 2001; Jung, Wranke, Hamburger & Knauff, 2014; Nicolle & Goel, 2013; Oaksford, Morris, Grainger & Williams, 1996; Oatley & Johnson-Laird, 2011; Palfai & Salovey, 1993; Pham, 2007; Rodríguez-Gómez, Pozo, Hinojosa & Moreno, 2019; Smith, Vartanian & Goel, 2014; Trémolière, Maheux-Caron, Lepage & Blanchette, 2018; Viau-Quesnel, Savary & Blanchette, 2018; Vroling & De Jong, 2009; Zahra, 2012), with only a few studies in the first one (e.g., Forgas, 2000; Markovits, Trémolière & Blanchette, 2018).

The possible link between the thinking abilities, in general, or between deductive reasoning ability, in particular, and the emotion regulation processes could be justified also through the intervention of a third common causal factor. Such a third common causal factor may be a biased processing of the emotional and reasoning information predominantly through one of the two processes (intuitive/heuristic/automatic vs. rational analytic/systematic/controlled) specified by a dual-process account of the psychological system (e.g., Markovits et al., 2018; Richards, Fenton-O'Creevy, Rutterford & Kodwani, 2018) or global (wholistic or simultaneous synthesis) vs. local (analytic or successive synthesis) processing style (Gross, 2005; Riding, 2001; Tamir, 2016; Tamir & Mauss, 2011), a personality trait, such as openness, conscientiousness, honesty/humility, neuroticism, extraversion/ introversion, effortful control, impulsivity or the ability to inhibit a prepotent answer (e.g., Bensi & Giusberti, 2007; Chamorro-Premuzic, Fuesting & Cody, 2019; Furnham, Forde & Cotter, 1998; Chamorro-Premuzic, Furnham & Moutafi, 2004; Houdé & Borst, 2015; Kalia, Fuesting, Cody, 2019; Moutafi, Furnham & Paltiel, 2005; Schweizer, 2002; Southward, Altenburger, Moss, Cregg & Cheavens, 2018; Tamir, 2005; Tamir & Mauss, 2011; Tops, Quirin, Boksem & Koole, 2017; Weller, Ceschi, Hirsch, Sartori & Costantini, 2018), perfectionism (Castro, Soares, Pereira & Macedo, 2017), a general thinking style, like verbal vs. nonverbal cognitive style (Gevins & Smith, 2000, in conjunction with Pe, Raes & Kuppens, 2013; Hebert-Myers, Guttentag, Swank, Smith & Landry, 2006; Kopp, 1989; Riding, 2001), abstract vs. concrete cognitive style (Watkins, Moberly & Moulds, 2008; Watkins & Moulds, 2005), adaptation-innovation cognitive style in problem solving (Hutchinson & Skinner, 2007), flexibility of the attentional and perceptual processes (Blair, 2002; Lasa-Aristu, Delgado-Egido, Holgado-Tello, Amor & Domínguez-Sánchez, 2019; Mathis & Bierman, 2015), cognitive flexibility (Davis & Nolen-Hoeksema, 2000; Goschke & Bolte, 2014; Kobylińska & Kusev, 2019), dichotomous thinking (Castro et al., 2017), different styles or biases in causal attributions for positive and negative events in what regards the internality vs. externality, stability vs. instability, and globality vs. specificity of their attributed causes (e.g., Abramson, Seligman & Teasdale, 1978; Fresco, Alloy & Reilly–Harrington, 2006), a negative inferential style or attributional styles, as hopelessness (Abramson, Metalsky & Alloy, 1989), helplessness (Abramson et al., 1978), appraisal

biases, as flexibility vs. rigidity, or moderate vs. extremeness in cognitive appraisals of events (Mehu & Scherer, 2015), cognitive need for closure (through the relationship with need of affect: approach vs. avoidance of affect; Leone & Presaghi, 2007, Maio & Esses, 2001), need for cognition (Maio & Esses, 2001), need to evaluate (Maio & Esses, 2001), personal need for structure (Maio & Esses, 2001), autonomy vs. connectedness (Bekker & Belt, 2006; Bekker & Croon, 2010; prospective data also in Cujé, n. d.), or motivational orientations (motivational orientation toward autonomy vs. external control; Balzarotti, Biassoni, Villani, Prunas & Velotti, 2016; Brenning, Soenens, Van Petegem & Vansteenkiste, 2015; Liew, Kwok, Chang, Chang & Yeh, 2014; Matsumoto, Yoo & Nakagawa, 2008; Stevens, Holmberg, Lovejoy & Pittman, 2013; Tamir, 2016), which will be examined also in the present research, the cultural environment (Gauvain, Munroe & Beebe, 2013; Mauss, Butler, Roberts & Chu, 2010; Mercier, 2016; Nisbett & Norenzayan, 2002; Norenzayan & Nisbett, 2000; Norenzayan, Smith, Kim & Nisbett, 2002; Novaes, 2013; Rothbaum & Rusk, 2011; Tamir & Mauss, 2011; Trommsdorff & Heikamp, 2013; Tsai, Knutson & Fung, 2006), the ability for counterfactual thinking or to generate alternative interpretations (Berry & Cooper, 2012), executive function (e.g., Bernier, Carlson & Whipple, 2010; Blair, 2002; Joormann & Quinn, 2014; Zelazo & Cunningham, 2007, or see a review of Schmeichel & Tang, from 2014, who showed that inhibition, updating, and shifting may be involved both in emotion regulation and logical reasoning), more specifically, a higher level of working memory (McRae, Jacobs, Ray, John & Gross, in 2012, who showed that reappraisal ability in emotion regulation was marginally related to abstract reasoning ability: $r = .18$, $p = .09$, whereas it had a significant positive correlation with measures of working memory), or age (a factor that will be treated below). All these possible common causal factors (whose causal status for deductive reasoning ability and emotion regulation processes is either already supported by the cited empirical research or can be supported theoretically), which were not exhaustively enumerated, may be important independently or through their associations in accounting the relationship between the deductive reasoning ability and emotion regulation processes.

The link between the deductive ability and emotion regulation is supported also by neuroimagining data indicating that "access to deductive logic involved a right ventromedial prefrontal area known to be devoted to emotion and feeling." (Houdé et al., 2001, p. 1) and a reciprocal engagement of the lateral/dorsal lateral prefrontal cortex (L/DLPFC) and ventral medial prefrontal cortex (VMPFC) in "cold" and "hot" reasoning, which "provides evidence for a dynamic neural system for reasoning, the configuration of which is strongly influenced by emotional saliency" (Goel & Dolan, 2003, p. 1). The role of the ventromedial prefrontal cortex in emotional influences on reason was extensively reviewed by Nicolle and Goel (2014). Other studies investigated the link between emotion and reasoning using event-related potentials (ERPs). For example, Blanchette and El-Deredy

(2014) obtained, in this way, data based on which they suggested that "the effect of emotion on reasoning might occur after actual inference making has taken place, maybe at the stage of conclusion maintenance, or response selection" (p. 52), not being the effect of early automatic processes.

Stollstorff (2013) presents also data in which the link between the performance in a syllogistic task (in which the belief bias was studied, i.e. one's tendency to reason incorrectly because her/his beliefs that are in conflict with the logical conclusion) and emotions depended on genetic individual differences between the participants. So, in her study regarding the effect of the interaction between serotonin (SERT) and dopamine (DAT1) transporter genes on negatively valanced emotional belief bias suppression, the preliminary data indicated "that carriers of both risk alleles (for negative emotional reactivity and poor inhibitory control: Short SERT and 10/10 DAT1, respectively) have significantly higher belief-bias (~17 per cent belief-bias score) relative to the other genotype groups (~6 per cent belief-bias score)" (Stollstorff, 2013, p. 14). In what respects only the SERT genes, their results showed that short allele carriers had less involvement of the right lateral prefrontal cortex (rIPFC) and "instead recruited the ventromedial prefrontal cortex (vmPFC) during emotional belief-logic conflict reasoning", "a region of the brain that is involved with emotional processing rather than belief-logic conflict resolution, which could lead to decisions based on highly salient emotional beliefs, rather than logical reasoning" (Stollstorff, 2013, p. 13). The cited author concluded that "certain environmental contexts or triggers might make it more difficult to reason logically for some individuals and could have the opposite effect for other individuals" (p. 15), depending on a genetically determined sensitivity to an emotionally negative (for short allele carriers) or positive effect (for long allele carriers). So, Stollstorff (2013) supports the view that "lower-level attentional bias towards or away from a specific emotional valence, caused by serotonin transporter genotype, can affect high-level thinking and reasoning via basic emotional and cognitive control brain regions" (p. 13). In the light of these results, she explains the mixed results obtained in some studies of the effect of emotion on reasoning as caused by the ignorance of the link between emotional valence of a reasoning task and the genotype of the studied participants.

Besides genotype, also the age is a factor to be considered when studying the relationship between the deductive reasoning and emotion regulation, particularly its goals. Citing a series of studies, in a review, Ricco (2010) presented synthetic data supporting the idea that affect-laden problems are more difficult than the affect-neutral problems for the older adults than for the younger adults, and that older adults differ also in what respects the goals of their emotion regulation and in their emotion regulation strategies: they dedicate "more resources to regulating their emotions in coping with interpersonal or everyday problems" (p. 420), "give relatively higher priority to achieving emotion regulation goals in interpersonal settings (Coats & Blanchard-Fields, 2008)" (p. 421), "opt more frequently than younger

adults for relatively passive regulation strategies such as withdrawal from the situation, avoidance, suppressing feelings, or self-distraction (Blanchard-Fields, 2007; Blanchard-Fields, Jahnke & Camp, 1995; Coats & Blanchard-Fields)" (p. 421).

When discussing the relationship between deductive reasoning and emotion, an important distinction has been taken into consideration (Loewenstein & Lerner, 2003; Pham, 2007): the one between incidental emotion (emotion unrelated with the reasoning content) and integrated emotion (emotion related with the reasoning content), a distinction that it may be important when discussing the relation between deductive reasoning and emotion regulation, too. For example, in a series of studies, it has been shown that sadness or depression favors a more systematic way of thinking (by taking into consideration a more complete list of possibilities) or a better performance in a syllogistic reasoning not in general, but only when the reasoning content engaged an integrated feeling of sadness or depression (Gangemi, Mancini, & Johnson-Laird, 2013; JohnsonLaird, Mancini & Gangemi, 2006; Oatley & Johnson-Laird, 2011). The same kind of results were replicated for other integrated emotions, such as guilt (Johnson-Laird et al., 2006) or terror (Blanchette, Richards, Melnyk & Lavda, 2007). Oatley and Johnson-Laird (2011) concluded, based on such studies, that "emotions that are pertinent to a topic being reasoned about improve performance–assuming the emotions are not of overwhelming intensity" (pp. 429-430). They explain the results of such studies based on the mental models theory, a theory that asserts that "reasoning calls for people to use the meanings of assertions and their knowledge to construct mental models of possibilities (see, e.g., Johnson-Laird et al., 2006)", by positing that "when individuals reason about the cause of an emotion, the emotion seems to prompt them to think of more possibilities than they would otherwise" (Oatley & Johnson-Laird, 2011, p. 430), so that "emotions, whether induced experimentally, or by an emotion producing event, or resulting from a psychological disorder, lead individuals to be more likely to construct models of possibilities pertinent to their source than to do so for other contents" (p. 430). Such results may discourage an explanation of the link between deductive reasoning and emotion regulation based solely on a general change in the style of thinking associated with a particular emotion and also brings in discussion the issue of the role played by one's emotion regulation goals.

If the relationship between one's deductive abilities and her/his emotion regulation processes in general has been only sporadically investigated, having in view mainly the emotion regulation strategies and their affective output, the relationship between one's deductive reasoning abilities and the way that person chooses what goal to pursue when regulating her/his emotions has been even less studied, if at all. The present research was firstly aimed to initiate the empirical investigation of the latter relationship in the particular case of the ability to reason syllogistically and of the degree of autonomy of the goals set to regulate negative emotions. To my knowledge, there is only a single empirical research, made by

Cohen and Andrade (2004), which investigated indirectly the issue of the link between one's emotion regulation goals and her/his logical thinking. The above-cited authors have shown, in a series of four studies, that one's intuitive theories about the way mood influences cognitive activity guides the choice of the emotion regulation goal such as to optimize the performance in a forthcoming cognitive logical task (a task that was only announced and never administered). Their results indicated that "when respondents have good reasons to remain in a negative affective state (e.g., an approaching analytical task), they appear to be deliberately willing to expose themselves to negative mood-congruent stimuli" and that "the results reversed when they faced a creativity task" (p.363). If, in what respects the emotion regulation strategies, empirical studies are relatively numerous, the ones regarding the emotion regulation goals are only a few, their research being at an early stage, too. Emotion regulation goals are rarely mentioned in the specific scientific literature, there is no instrument for their direct and exhaustive assessment, to my knowledge, and empirical data about the factors involved in their setting are scarce. By studying their relationship with the deductive thinking abilities, it is to be expected to find out data regarding the process of their setting. Correlatively, investigating their association with the performance in a deductive task, important information regarding the deductive reasoning processes can be find out, too. So, the link between the deductive abilities and emotion regulation goals may be important to be studied not only for itself, but also because it can provide data regarding the deductive reasoning and the emotion regulation processes (in particular, emotion regulation goal setting). Consequently, the nature of the present study was not aimed to be only a confirmatory one, by supporting the existence of an expected association between the investigated deductive ability and emotion regulation goals, but also an exploratory one, by trying to extract data relevant for the understanding of the deductive reasoning (in particular, categorical syllogistic reasoning) and of the way in which the emotion regulation goals are chosen. These data, obtained through a descriptive-correlational method, may be used, in the future, for more detailed experimental investigations of the causal relationships between the variables examined in the present study.

Besides the direct and specific theoretical support for the existence of a relationship between one's deductive reasoning and her/his preferred emotion regulation goals that will be presented below, an indirect and more general support for this relationship may be provided also by the theoretical and empirical works cited above as a support for the relationship between one's deductive reasoning and her/his emotion regulation from the perspective of its preferred strategies and, implicitly, its results. This statement is founded on the general idea that goals may be chosen based on the available strategies and, in the same time, on the general idea that one's strategies may be preferentially acquired or developed so that to maximize the fulfilment of the chosen goals. No matter of the direction of this possible circular causality (which was rather not studied empirically, to my knowledge)

between one's emotion regulation goals and strategies, it may be inferred that those factors that play a role in shaping one's emotion regulation strategies or which are influenced by one's emotion regulation strategies may also play a role in the choice of the emotion regulation goals of that person or may be influenced by her/his emotion regulation goals.

In the current research, the starting idea was the supposition that thinking abilities demonstrated in a syllogistic reasoning task either might represent cognitive resources mobilized during emotion regulation processes or taken into consideration when setting one's emotion regulation goals (Cohen & Andrade, 2004), or their development or evolution could be influenced by causal factors that are common to them and to the emotion regulation development or evolution, or the preference for certain emotion regulation goals might influence the development and use of the abilities to reason deductively. Consequently, no matter the case, it was expected an association between the performance in a syllogistic task and the scores for an instrument through which the preference for several types of emotion regulation goals could be assessed indirectly: Self-Regulation of Withholding Negative Emotions (SRWNE), an instrument elaborated by Kim, Deci, and Zuckerman (2002).

SRWNE is an instrument based on the Self-Determination Theory, a theory conceived by Deci and Ryan (1985, apud Kim, Deci & Zuckerman, 2002), which asserts the existence of a continuum between two extreme poles of the motivational orientation or, correlatively, of the intentional behavior: autonomous behavior and, respectively, the behavior controlled by interpersonal and intrapsychic forces (as inner urges). In their view, the first type of behavior results from the progressive internalization of the external rules through which the latter type of behavior is controlled. It was assumed by the authors of the SRWNE instrument that emotion regulation, too, like any other behavior, could be framed in the above-mentioned schema of the Self-Determination Theory, an idea that led them to distinguish between four types of emotion regulation: *external* (when there is no internalization of the external control), through *introjection* (when the internalization of the external control is only partial), through *identification* (when, through internalization, there occurs a personal voluntary, autonomous, identification with the kind of emotional self-regulation promoted in one's community), and *integrated* (when the internalization of the external control is complete, which implies a full awareness of one's own emotions and the feeling that the regulation of their expression is a free choice). Each of the four types of emotion regulation proposed by Kim et al. (2002) has, in their view, a correspondent emotion regulation goal. *The goal of the external emotion regulation* is the obedience to or compliance with the external control of emotion. *The goal of the emotion regulation through introjection* would be to avoid shame or guilt for having or expressing a certain emotion. *The goal of the emotion regulation through identification* is assumed to be the avoidance of causing negative effects for the group processes of the collectivity with which one identifies and whose harmony is highly valued by that person. *The goal of the*

integrated emotion regulation would be "not to comply with social norms by suppressing strong inner urges; rather, it is to assimilate emotions and utilize inner experiences flexibly in acting autonomously" (Kim et al., 2002, *p*. 318). As it is pointed out by Coats and Blanchard-Fields (2008), this type of emotion regulation indicates a high personal valuation of emotional regulation, which is assumed consciously, as a deliberate goal.

External and the introjected emotion regulation are subsumed by Kim et al. (2002) under the supertype of *controlled emotion regulation*, and the identified and integrated emotion regulation under the supertype of *autonomous emotion regulation*. The cited authors show that the controlled emotion regulation is accompanied by a feeling of internal conflict, which can be detrimental for one's physical and mental health, whereas the autonomous emotion regulation is not associated with an internal conflict, having instead a potential positive effect on one's physical and mental health. It can be noted that the feeling of an internal conflict associated with the controlled emotion regulation may be detrimental also when performing deductive tasks (which may lead, consequently, to the underdevelopment of the deductive abilities), as it has been shown to be the case for other negative emotional feelings (e.g., Oaksford et al., 1996). In Kim's et al. (2002, p. 323) study, the controlled regulation "was positively associated with negative indicators of affect status", specifically with "pessimism, social anxiety, mistrust of others, external locus of causality, and lack of emotional awareness". Kim et al. (2002) define also the supertype of *relative autonomy* of the emotional regulation, as a difference between the preference for the autonomous emotion regulation and the preference for the controlled emotion regulation. The autonomous emotion regulation as measured with SRWNE (the scores for the identified and integrated emotion regulation and the composite score for the autonomous emotion regulation) "related negatively to negative indicators of affect status", but it was also "related positively to social anxiety and mistrust of others", suggesting, in the view of the cited authors, that "no matter what one's reasons for withholding negative emotion, the withholding is related to social anxiety and mistrust" (Kim et al., 2002, p. 323). The relative autonomy index related positively to measures for "optimism, emotional awareness, internal locus of causality, and lack of social anxiety" (Kim et al., 2002, p. 323). Finally, Kim et al. (2002) noted that "the controlled SRWNE subscales showed stronger correlations with emotion measures than did the autonomous subscales" (p. 324), a result suggesting, in their view, "that the emotion measures may be reflecting aspects of emotional regulation that are controlled to varying degrees by interpersonal or intrapersonal forces, rather than reflecting characteristics that involve choice by the self" (p. 324).

SRWNE is an instrument through which the four types and the three supertypes of emotion regulation mentioned above are investigated in the case of the negative emotions, as representing different levels of internalization of the reasons for withholding their experience and expression.

The choice of the emotion regulation goals that vary on the dimension of heteronomy-autonomy was made in this research by taking into consideration some previous data (published and unpublished ones) obtained in another research (Faiciuc, 2009, 2017), in which it was investigated (on a sample of high school students of 10th grade, with an average age of 16 years – 29 girls, and 19 boys –, having an elementary training in formal logic) the relationship between the deductive performance in an abstract symbolic syllogistic task (24 syllogisms, 12 valid, 12 invalid, the same as in the current research, with a similar instruction, but in a different linguistic format: see Appendix 2) and the autonomous style of thinking (measured with the autonomous thinking scale – AT scale – of the A/H questionnaire, elaborated by Monica Albu, Ioan Berar, Dragoş Cârneci, Cîmpian Erika, Lucia Faiciuc, Marius Florea, and Elena Geangu, whose psychometric data were presented by Berar and Albu, in 2006), controlling for the motivational orientation toward autonomy (measured with the Autonomy Orientation Scale of the General Causality Orientations Scale: GCOSA, elaborated by Deci & Ryan in 1995) and for the performance in a general intelligence test (Raven Standard Progressive Matrices). In that research, the investigated relationship was controlled in what respects the motivational orientation toward autonomy because it was found (as unpublished data) a significant positive correlation between the motivational orientation toward autonomy and the performance for the valid syllogisms (Spearman rank correlation coefficient $\rho = .303$, $p = .043$, N = 29, one-tailed), whereas no significant relationship was found between that motivational orientation and the performance for the invalid syllogisms. The positive association between the motivational orientation toward autonomy and the performance for the valid syllogisms was significant even after controlling the performance in the administered general intelligence test (Raven Standard Progressive Matrices): nonparametric partial correlation was $r = .384$, $p = .017$, $N = 29$, one-tailed. Analyzing that relationship by taking into consideration the classical distinction made by Johnson-Laird and Bara (1984) between the one-model syllogisms (the ones supposedly requiring the elaboration of only one mental model based on the explicit information given in the premises in order to solve them) and multiple-model syllogisms (the ones supposedly requiring, besides the initial mental model mentioned above, the elaboration of alternative mental models, which makes explicit the implicit information given in the premises, in order to solve them), there was find out that the predominant contribution to that relationship may be that of the multiple-model syllogisms (Spearman rank correlation coefficient $\rho = .363$, $p = .019$, N = 29, one-tailed; nonparametric partial correlation coefficient, controlling for the performance in the Raven Standard Progressive Matrices, $r = .395$, $p = .014$, $N = 29$, one-tailed), the investigated relationship being seemingly weaker or absent in the case of the one-model syllogisms (Spearman rank correlation coefficient $\rho = .170$, $p = .173$, one-tailed; nonparametric partial correlation coefficient, controlling for the performance in the Raven Standard Progressive Matrices,

r = .199, p = .146, N = 29, one-tailed). Separating the sample in two groups based on the median level of performance at the Raven Standard Progressive Matrices, for those with a lower score for the Raven Standard Progressive Matrices, there was obtained a statistically significant rank correlation between the GCOSA score and performance for the valid syllogisms (ρ = .52, p = .034, N = 13, one-tailed), explained by similar positive associations relatively close to the chosen statistical significance threshold between the GCOSA score and the performance for the one-model (ρ = .381, p = .1, N = 13, one-tailed) and, respectively, multiple-model (ρ = .338, p = .129, N = 13, one-tailed) syllogisms, but also a marginally statistically significant rank correlation between the GCOSA score and performance for the invalid syllogisms (ρ = .472, p = .052, N = 13, one-tailed). For those with a higher score for the Raven Standard Progressive Matrices instead, there was no correlation between the GCOSA score and the performance for the invalid syllogisms, and there was only a tendency toward a positive correlation between the GCOSA score and the performance for the valid syllogisms (ρ = .313, p = .119, N = 16, one-tailed), explained mainly through the marginally statistically significant rank correlation between the GCOSA score and performance for the multiple-model syllogisms (ρ = .42, p = .052, N = 16, one-tailed), because there was no correlation between the GCOSA score and performance for the one-model syllogisms.

The link between the personal autonomy and the performance for the valid syllogisms was supported supplementarily by the data regarding the statistically significant positive correlation between the performance for the valid syllogisms (see the syllogistic task from Appendix 2) and the autonomous style of thinking and behavior (measured with AT scale of the A/H questionnaire for the autonomous style of thinking, or, respectively, for the autonomous behavior, with the total score of the A/H questionnaire, cited above), after controlling for the motivational orientation toward autonomy (measured with GCSOA) and performance at the Raven Standard Progressive Matrices: nonparametric partial correlation coefficient was r = .538, p = .001, N = 28, one-tailed, for the AT scale, and nonparametric partial correlation coefficient was r = .526, p = .002, N = 28, one-tailed, for the total score of the A/H questionnaire. In the same time, in what respects the invalid syllogisms, there was obtained only a very weak tendency toward a negative correlation between the performance in their solving and the score for the AT scale: r = -.222, p = .12, N = 28, one-tailed, after controlling for the motivational orientation toward autonomy (measured with GCSOA) and performance in the Raven Standard Progressive Matrices, and no significant correlation with the total score of the A/H questionnaire. A more detailed analysis (Faiciuc, 2009, 2017) revealed that the negative association between the performance for the invalid syllogisms and the autonomous style of thinking (score for AT scale) becomes statistically significant only for the group of participants with higher scores at the Raven Standard Progressive Matrices: ρ = -.495, p = .026, N =16, one-tailed, and, also, that, for this group of participants, there occurs a statistically significant

negative correlation between the performance for the invalid syllogisms and the total score of the A/H questionnaire: ρ = -.460, p = .042, N =13, one-tailed. In the same time, that detailed analysis indicated that the positive association between the performance at the valid syllogisms and the score for the AT scale was statistically significant only for the group with lower scores at the Raven Standard Progressive Matrices: ρ = .482, p = .007, N =25, one-tailed, as it was also the case for the positive association between the performance for the valid syllogisms and the total score for the A/H questionnaire: ρ = .332, p = .045, N =27, one-tailed. The computation of the partial correlations separately, for the one-model and, respectively, multiple-model syllogisms, on the entire sample, controlling for the motivational orientation toward autonomy (measured with GCSOA) and performance at the Raven Standard Progressive Matrices, revealed that only for the one-model syllogisms occurred a significant association between their correctness and the total score of A/H questionnaire, or the score of its AT scale (nonparametric partial correlation coefficient r = .452, p = .006, N = 28, one-tailed, and, respectively, r = .542, p = .001, N = 28, one-tailed). This correlation was significant both for the participants with a lower level of performance at the Raven Standard Progressive Matrices and for those with a higher level of performance at the Raven Standard Progressive Matrices.

On the other hand, the motivational orientation toward control, measured with the General Causality Orientations Scale (Deci & Ryan, 1995), correlated statistically significantly (also an unpublished data) only with the performance for the invalid syllogism, the correlation being a negative one: ρ = -.380, p = .015, N =33, one-tailed (the nonparametric partial correlation coefficient, after controlling for the performance at the Raven Standard Progressive Matrices, was r = -.33, p = .035, N = 29, one-tailed, the negative correlation being higher for the participants having a higher level of intelligence). Nevertheless, when taking into account the distinction between the one-model and multiple-model valid syllogisms, there occurred a significant negative correlation between the score for the motivational orientation toward control and the performance for the valid multiple-model syllogisms: ρ = -.361, p = .025, N =30, one-tailed, whereas the correspondent correlation for the one-model syllogisms was not statistically significant. When controlling for the performance at the Raven Standard Progressive Matrices, the correlation between the score for the motivational orientation toward control and the performance for the valid multi-model syllogisms became marginally significant: nonparametric correlation coefficient was r = -.305, p = .06, N =27, one-tailed. Finally, a composite score was calculated for the relative autonomy in motivation, by subtracting the standard score (z score) for the controlled motivation scale (GCOSC) from the standard score (z score) for the autonomous motivation (GCOSA). The score for the relative autonomy in motivation correlated positively with the correctness of the valid syllogism: ρ = .35, p = .025, N =33, one-tailed, tended slightly to correlate positively with the correctness of the invalid syllogisms: ρ = .237, p = .092, N =33, one-tailed, correlated positively with

the correctness for the multiple-model valid syllogisms: ρ = .552, p = .001, N =30, one-tailed (the significant correlations were maintained after controlling for the performance at the Raven Standard Progressive Matrices). No significant correlations were obtained between this composite score and the performance at the Raven Standard Progressive Matrices, or the correctness for the one-model syllogisms. I will not discuss here the theoretical base or interpretation of these data. They were mentioned in the current research not only in order to provide a rationale for the investigation of the level of autonomy of the emotion regulation goals in their relationship with the syllogistic performance, but also because they might be important in the interpretation of its results, given the similar assessment of the syllogistic ability in the two studies and the possible relationship between the autonomous motivational orientation or the autonomous style of thinking and behavior (the score for GCOSA correlated significantly in the study cited above with the score for AT : ρ = .414, p = .008, N =33, one-tailed, and with the total score for A/H questionnaire: ρ = .392, p = .012, N =33) and the level of autonomy of the preferred emotion regulation goals. Consequently, the data obtained in the current research might also serve to investigate the replication of the data from Faiciuc (2009, 2017) on a larger sample, with a different composition, at a higher age, in which the relevant variables were assessed with different, but, hypothetically, related instruments.

In the current research, the syllogistic task was somewhat different than the one used in Faiciuc (2009, 2017). The syllogisms and their order were the same, but, while in Faiciuc (2009, 2017) only one version of the syllogistic task was administered, with an abstract content with a linguistic format that was ambiguous in what respects its extensional or intensional interpretation (see Appendix 2), in the current research, the syllogistic task was presented in two versions for each participant. In the first version, the syllogistic terms and judgments express exclusively extensional relationships (i.e., relationships between sets or elements of sets). That is why it was shortly named as **E** task version (from **E**xtensional). It had the same number and types of answer options (the four types of judgments: **A** (universal affirmative), **E** (universal negative), **I** (particular affirmative), **O** (particular negative), expressed extensionally, and "no valid conclusion" option – see Appendix 2, the A, B, C, D, and, respectively, E answer options) as in the task used in Faiciuc (2009, 2017). In the second version of the syllogistic task, in each syllogism, some syllogistic terms and judgments express intensional relationships (relationships between sets and the defining properties of the elements included in those sets), and some of them extensional relationships, in accordance with the prescriptions of the natural logics proposed by Didilescu and Botezatu (1976). Consequently, they had a mixed semantics. It was the reason for which it was named as the **M** task version (from **M**ixed). For the **M** version of the syllogistic task, the answer options were also different than the answer options from the **E** version of the task and from the task used in Faiciuc (2009, 2017), as for each of the four types of answer

judgments (**A**, **E**, **I**, **O**) from the **E** version of the task, formulated in an exclusive extensional linguistic format, was added an exclusively intensional version, only one of the two being in accordance with the requirements of the mixed semantic model of Didilescu and Botezatu (1976). This change of the answer options in the **M** version of the syllogistic task was made in order to investigate the respondents' sensitivity to the mixed semantic interpretation of the syllogisms, assessed by computing a relative concordance score (as a percentage of the logically correct answers that are concordant with the ones required by the mixed semantic model of syllogisms from the total logically correct answers, no matter of their extensional or intensional linguistic format). The syllogistic task was administered in the two versions because there was assumed (based on Faiciuc, 2009, 2017) that they may imply different deductive processes, the **E** version favoring presumably a general purpose analytic deductive thinking (in which the solution is found through the systematic investigation of all the possibilities, requiring, at least initially, an effortful and deliberate thinking process), and the **M** version favoring presumably, especially for the valid syllogisms, a process of inferring the necessary conclusion based on the completion of an abstract pattern (supposedly requiring rather an effortless and automatized thinking process), conceived to be like a syllogistic schema specific for a certain syllogism, which emerges through the frequent encountering of that syllogism in the argumentative experience (see Faiciuc, 2009, 2017). So, considering the two versions of the syllogistic task, it would be possible to explore if the preference for the investigated emotion regulation goals is associated in a particular way with the two types of processes that were assumed to be involved in the **E** and, respectively, **M** version of the syllogistic task.

HYPOTHESES

Irrespective of the nature of the causal relationship between the thinking abilities (in particular, the syllogistic thinking abilities) and the investigated emotion regulation goals (i.e., if it is one in which the causal role is played mainly by the thinking abilities, by the emotion regulation goals, by another common causal factor, or if a circular causality is the case), in the present research, the following general associations (as hypotheses) were expected:

1). A *positive correlation between the total correctness score for the categorical syllogism task and the scores for the SRWNE scales that assess the preference for the autonomous emotion regulation* (i.e., the scores for the identified and integrated emotion regulation scales, and the composite scores for the autonomous emotion regulation and for the relative autonomy of the emotional regulation);

2). A *negative correlation between the total correctness score for the categorical syllogism task and the scores for the SRWNE scales that assess the preference for the emotion regulation through direct or indirect external*

control (i.e., the scores for the external and introjected emotion regulation scales, and the composite score for the controlled emotion regulation).

Although, given the above-mentioned data from the study presented in Faiciuc (2009, 2017; some of them unpublished, because were not directly linked with the hypotheses of the cited study), these hypotheses may seem overly general and unwarranted, because they refer to the total correctness for the syllogistic task, and not specifically to the correctness for particular types of syllogisms that correlated previously with some aspects of the autonomous functioning in particular ways and conditions in Faiciuc's (2009, 2017) study, I chose this general formulation of the hypotheses, in the first place, because currently no empirical data are available in what respects the direct relationship between the preference for emotion regulation goals with different levels of autonomy and the motivational orientation toward autonomy or, respectively, autonomous thinking style. Consequently, it is theoretically possible that the preference for autonomous emotion regulation goals might have different relationships with the performance for the investigated types of syllogisms than the ones had by the autonomous style of thinking/behavior, or the motivational orientation toward autonomy, with the performance for those types of syllogisms from the Faiciuc's (2009, 2017) study. On the other hand, it is also theoretically possible that the preference for autonomous emotional regulation goals might be positively associated with the autonomous style of thinking or, respectively, with the motivational orientation toward autonomy, because they are causal related or, maybe, because of a common causal factor referring to a general autonomous functioning. The second reason for which the primary hypotheses were formulated in a general way was that, in the present research, the syllogistic task was somewhat different in what respects its linguistic format than the one used in Faiciuc (2009, 2017). Consequently, the specific results obtained in the previous study might not hold for the current one.

Even though, by taking into account the above-mentioned considerations, no specific hypotheses were formally stated regarding the expected correlations between the computed SRWNE scores and the performance for various types of syllogisms of the two versions of the syllogistic tasks or, respectively, the computed concordance scores for the valid syllogisms in the **M** version of the syllogistic task, given the fact that the exploratory part of the present study was also aimed to investigate the replication of the published and unpublished results obtained in Faiciuc's (2009, 2017) study in the relatively similar conditions of the current research, the chosen value for the statistical significance threshold when computing the relevant correlations was the one for a one-tailed significance test, by assuming that those correlations should have the same directionality as in Faiciuc's (2009, 2017) study. Consequently, as *secondary specific hypotheses*, it would be expected, for similar reasons to the ones mentioned in Faiciuc (2009, 2017), that mainly valid syllogisms should correlate positively with the preference for autonomous emotion regulation goals (here it is not included the composite

score for the relative autonomy of emotion regulation), and that predominantly the performance for the invalid syllogisms or the multiple-model valid syllogisms might correlate negatively with the preference for the controlled emotion regulation goals. This pattern of correlations may be different for the two versions of the syllogistic task. For the valid syllogisms, the significant correlations of their correctness with the autonomous (positive correlations) and controlled (negative correlations) emotion regulation scores should be in general higher or more frequent in the **M** version than in the **E** version of the syllogistic task. This prediction should hold true if the **M** version of the syllogistic task succeeds more than its **E** version to elicit the assumed hypothetical syllogistic schemata, presumably developed through frequent argumentative experiences. The frequency of such experiences should be higher for those persons that tend to decide and judge for themselves the way they think, behave, feel affectively or the way they set their goals, i.e. for those persons who are autonomous in various aspects of their life (for example, through more internal deliberation or more polemical or controversial discussions). The above-mentioned syllogistic schemata are conceived to serve as shortcuts in the process of solving syllogisms (especially for the more difficult ones, the so-called multiple-model syllogisms), which, in this way, relies less on one's working memory (required in a greater extent by the analytic processes) and more on the acquired knowledge regarding the logical structures (which may be associated with particular linguistic cues) of the syllogisms, as they are encountered in the usual life. The linguistic format of the **M** version of the syllogistic task supposedly favors the recognition of those logical structures, as they were identified by Didilescu and Botezatu (1976). In the argumentative experiences encountered in the daily life, valid syllogisms may be way more frequent than invalid syllogisms, because it is usually cognitively more important, in the day-to-day life (i.e., not in an academic environment), to infer or to demonstrate to others that something is the case than to infer or to demonstrate to others that no valid conclusion can be inferred based on some given data. Consequently, it is to be expected that the assumed syllogistic schemata might be developed, in the general population, more frequently for valid syllogisms than for the invalid syllogisms. Moreover, the persons with a high level of general autonomous orientation in various aspects of their life, presumably with more argumentative experiences, may have more syllogistic schemas, especially for the valid syllogisms, may be more able to recognize them without helping cues, and, when they need such helping cues and they are available, they will be able to take them more into account (as it is expected to be in the case of the linguistic cues provided by the **M** version of the syllogistic task), and, correlatively, would rely less on working memory processes during the inference process than the persons with a low level of the general autonomous orientation in the regulation of their behavior. At the same time, in the case of those with a high level of general autonomous orientation, it is foreseeable that the ceiling effects in the recognition

of the syllogistic schemata (when the helping cues are superfluous) and their confusion (when the syllogistic schema for an easily recognizable syllogism would be misused for a similar syllogism that is hardly recognizable) would be more frequent. It is to be expected also that the higher is the preference of a person for the external control of her/his thinking and behavior (inclusively at an emotional level), the less argumentative experiences will be encountered by her/him, and, consequently, the fewer would be her/his syllogistic schemata (especially for the less frequent syllogisms, i.e. the multiple-model ones), the lower her/his ability to recognize them without helping cues and to take those cues (as the ones from the **M** version of the syllogistic task) into account when they are available, in case she/he needs them, and, correlatively, the higher would be the involvement of the working memory processes during the inference process.

The distinction between the one-model syllogisms and multiple-model syllogisms, which is more relevant when a person has not acquired the solving shortcuts of the syllogistic schemata (being constraint to use exclusively analytic, systematic, processes, dependent heavily on the working memory for all the multiple-model syllogisms), overlaps partially with the level of the cognitive relevance and importance of the syllogisms: the one-model syllogisms happen to be usually the ones that are more important cognitively (therefore, more frequently encountered and learned), as the conclusion for four of them (of the six one-model syllogisms from this syllogistic task) is an universal judgment, i.e. a judgment that states something with the highest level of generality, and two of them are particular affirmative judgments, whereas, for all the six valid multiple-model syllogisms, the conclusion is a particular negative judgment, presumably the least informative judgment (see also, Chater & Oaksford, 1999), and, finally, the invalid multiple-model syllogisms are the least important in the usual pragmatic life, as nothing can be ascertained based on the given information. So, one-model syllogisms may be easier not only because they require the building of only one hypothetical mental model for finding out the valid conclusion, without the significant involvement of the working memory (as stated by Johnson-Laird and Bara, in 1984), but because they are more frequently encountered in the usual argumentative experience given the higher informativeness of their conclusion. Consequently, shortcut syllogistic schemata would be more frequently formed for them, which would be also easier to be recognized, even in less favorable conditions, than it would be the case for the multiple-model valid syllogisms. Furthermore, one-model syllogisms would be, presumably, less favored by the **M** version of the syllogistic task in their solving than the multiple-model valid syllogisms, because a ceiling effect in the recognition of their syllogistic schemata may be more probable as a consequence of their overlearning. In the same time, it may be that the correctness for the one-model syllogisms correlates less with the level of autonomy in various aspects of life than the correctness for the multiple-model valid syllogisms, because, given the ubiquity of the one-model syllogisms in the daily life, their shortcut syllogistic

schemata can be implicitly learned at a satisfactory level for their recognition in favorable (or even usual) conditions, even by persons who do not have a high level of argumentative experience (a level that might correlate presumably positively with the level of autonomy in various aspects of one's life, and negatively with the preference for an external control of one's thinking, feeling, or behavior). If it were to occur a significant correlation between the correctness of the one-model syllogisms with the level of autonomy or external control in one's life, it should occur more probably for the **E** version of the syllogistic task (than for the M one), if a ceiling effect is in place, because the linguistic cues provided by **M** version of the syllogistic task would be superfluous in what respects the improving of the recognition of the assumed syllogistic schemata in this case. Instead, in the absence of the ceiling effect, a significant correlation between the correctness of the one-model syllogisms and the level of autonomy or external control in one's life should occur more probably for the **M** version of the syllogistic task.

For the multiple-model valid syllogisms, the association between the level of autonomy or external control in the various aspects of one's life and their correct solving may be more pronounced especially for the **M** version of the syllogistic task. It may be so, because they are presumably less frequently encountered in the usual argumentative experiences, so that a person with a higher level of such experiences (and, correlatively, of autonomy) would have more chances to encounter them and to learn their schemata than a person with a lower level of autonomy, who may not have shortcut syllogistic schemata for them at all. Being less frequently encountered, the probability that they would be overlearned to a ceiling level, i.e. to a level for which their schemata are recognized no matter the conditions, and for which no benefit is obtained for their recognition by adding favoring cues (as it is the case for the **M** version of the syllogistic task), should be lower than in the case of the one-model syllogisms. So, if a person has schemata for them, it is possible that she/he may recognize those schemata in the **M** version of the syllogistic task, when the provided linguistic cues help their recognition, but not in the **E** version of the syllogistic task, in which the recognition of those shortcut schemata is not encouraged. Consequently, their solving would involve rather an analytic process, dependent in a higher degree on the working memory, as it should be also the case for the invalid syllogisms (which are of a multiple-model type, too), a process that may be more error prone than the simple recognition of a syllogistic schema. Moreover, without helping cues, a syllogistic schema developed for a one-model syllogism might be more probable misused, especially in the **E** version of the syllogistic task, for a similar multiple-model valid syllogism. That is why, in the case of the multiple-model valid syllogisms, the association between their correct solving and the level of autonomy or external control in the various aspects of one's life may be more obvious in the case of the **M** version of the syllogistic task, the one that offers cues for the recognition of the syllogistic schemata, in case they exist. In case they do not exist or their representation is very

weak (i.e., those syllogistic schemata are underlearned), it is hard to make a unilateral prediction in what regards the linguistic format of the syllogistic task in which the association between the correct solving of the multiple-model valid syllogisms and the level of autonomy and control in the various aspects of one's life has more chances to occur, because that association may depend on the balance between several factors that may be associated with the SRWNE scores and that may have contradictory effects on their solving, as it will be detailed in what follows, in the similar case of the multiple-model invalid syllogisms.

So, for the invalid syllogisms, too, less clear predictions can be made in what respects the pattern of the correlations between their correct solving in the two versions of the syllogistic task and the computed SRWNE scores, from the same reason invoked above for the case of the multiple-model valid syllogisms, when the participants do not have syllogistic schemata for them. On the one hand, because they are presumably the least encountered in the usual argumentative experience (which is presumably higher at the persons preferring an autonomous way of functioning, and lower for those who prefer an externally controlled way of functioning), the level of autonomy or external control in the various aspects of one's life should not correlate with their correct solving both in the **M** and **E** versions of the syllogistic task, as they, probably, do not have syllogistic schemata. But, on the other hand, because a person may misrecognize an invalid syllogism to be a similar valid syllogism, for which she/he has a syllogistic schema, it is also possible that her/his performance for the invalid syllogisms to correlate with her/his level of autonomous functioning both negatively and positively. It may correlate negatively, because the more syllogistic schemata are overlearned through a higher level of argumentative experience, the more confusions are possible between the valid and the invalid syllogisms (a kind of illusory cognitions), as a consequence of the uncontrolled activation of a strong representation of a syllogistic schema, as predicted by the model proposed by Cleeremans (2006), lowering, consequently, the correctness score for the invalid syllogisms. It may also correlate positively, because the level of confusion between the valid and invalid syllogisms would be lowered when the provided linguistic cues of the learned syllogistic schemata for the valid syllogisms, in the **M** version of the syllogistic task, help their discrimination, especially when the representations of the involved syllogistic schemata have a medium strength and, consequently, their activation would be more controllable, in accordance with the Cleeremans' (2006) model. The above–mentioned confusions or their absence may be more probable in the case of the **M** version of the syllogistic task, because, in its case, the syllogistic schemata, if they exist, would be more easily recognized or misrecognized, given its favoring linguistic cues.

From another theoretical perspective, if the invalid syllogisms, as multiple-model syllogisms, are more dependent in their solving on the building of alternative mental models that requires supplementary working memory resources,

and, if the emotional states (especially the negative ones) interfere with reasoning by occupying those resources, it is possible that they should be more affected in their solving than the one-model syllogisms, irrespective of the version of the syllogistic task, a prediction that would hold true also for the multiple-model valid syllogisms. If the persons with autonomous emotion regulation goals had more balanced and positive emotions, as indicated by the results of Kim et al. (2002), cited above, they should have a higher performance for the invalid syllogisms or, in general, for the multiple-model syllogisms, than the persons with a lower level of autonomous functioning. On the other hand, if a higher level of positive affectivity was associated with the autonomous emotion regulation and, from another theoretical perspective, if that positive affectivity might encourage the solving of the syllogisms based on some heuristic, less systematic, processes (see above; e.g., Blanchette & Richards, 2010), the performance for all the multiple-model syllogisms, especially for the invalid ones, should be lower for the persons with a higher level of autonomous functioning (than for those with a lower one), as they would be more error prone when heuristic strategies are used for their solving, irrespective of the version of the syllogistic task. The obtained data should be of help in discerning from the above-mentioned theoretical alternatives or from other ones, which were not mentioned here. The predictions regarding the pattern of correlations between the computed SWRNE scores and the syllogistic performance for the considered types of syllogisms in the **E,** and **M** versions of the syllogistic task are complicated supplementary by the possible order effects (e.g., carry-over or priming effects, which may frame the interpretation of the syllogisms from the version of the syllogistic task administered in the second position, based on the version of the syllogistic task administered in the first position) occurring in the two groups with a different administration order of the versions of the syllogistic task. Those order effects are hardly foreseeable, because of several possible factors that may play a role in solving the version of the syllogistic task administered in the second position. That is the reason for which no tentative hypotheses were made in that respect, and for which the whole data analysis will have a prominent exploratory character.

To the theoretical assumptions used in the previous study (Faiciuc, 2009, 2017), a series of other theoretical assumptions were added in the present research in order to formulate the general hypotheses. One of them is that emotional regulation can be interpreted to be a problem like any other problem, implying cognitive resources for its resolution, as it was also mentioned above. Such a cognitive resource would be the ability for deductive reasoning (needed, for example, in the categorization of the emotional feelings, or of the emotional regulation goals, for the determination of their properties, or of their causes). Consequently, those having a superior deductive ability should have also a superior emotion regulation, which seems to be associated with the autonomous emotion regulation (see Kim et al., 2002). It is reasonable to assume, too, that a person may

take into consideration explicitly or implicitly such cognitive resources when she/he chooses her/his emotion regulation goals. Having more cognitive resources may encourage a person to choose more autonomously her/his emotion regulation goals, knowing that she/he is able to choose them in accordance with her/his regulatory possibilities, and in accordance with the particular context. The choice of a more autonomous emotion regulation goal may lead also to a more efficient emotion regulation, leading to a virtuous circle, based on a circular causality. As it was noticed by Kim at al. (2002), the controlled emotion regulation is associated with a problematic emotion regulation, whereas the autonomous emotion regulation, especially the relative autonomy of the emotional regulation, is associated with a more efficient emotion regulation. Viewed from another perspective, a higher level of general autonomy might mean a higher level of cognitive resources, needed by any efficient autonomous decision, made without an external support, and, consequently, it is to be expected that a person with a high level of general autonomy would have also an autonomous emotion regulation.

Another possible alternative or complementary theoretical assumption is that that a deficient emotion regulation capacity (possibly associated with the external control of the emotion regulation goals) may negatively influence the deductive reasoning processes (e.g., through basic attentional effects, priming of concepts and knowledge structures, computational capacity, or reflective processes, as it is noted, for example, by Blanchette & Richards, in 2010), leading to more errors and biases in deductive tasks (e.g., Vroling & De Jong, 2009), as it might be the case, for example, when a fear occurs for a negative evaluation of one's performance in those tasks. By extension, the same can be true from a developmental perspective, as a deficient emotion regulation capacity may negatively influence the general development of the deductive reasoning processes, especially the ones requiring analytic, systematic, thinking. Failures in cognitive processes like the deductive ones or in emotion regulation may be associated with a lower trust in one's own decisions and may favor a less autonomous choice of the emotion regulation goals, i.e. the preference for an external control of one's emotion regulation. In this way, a vicious circle may occur, also based on a circular causality.

A completion for the two theoretical assumptions considered above, complicating their predictions in particular cases, may be that deriving from data obtained by Wegener, Petty and Smith (1995, apud Blanchette & Richards, 2010), which indicate that the "reduced message scrutiny as a result of positive mood may be modulated by strategic factors, for instance if the message is likely to improve or worsen mood (Blanchette & Richards, 2010, p. 304). One may infer from the above-mentioned statement that the link between one's emotions and moods and her/his reasoning processes may depend on her/his emotional regulation goals and expectations regarding the way the reasoning processes may influence the accomplishment of those goals, as it happens in the motivated reasoning or justification. In other words, it may be that one may want to have a good

performance in a syllogistic task, investing all her/his available resources, or not, based on the way she/he sets her/his emotion regulation goal in that moment and on her/his beliefs in what respects the chances to have a good or bad performance and the way that performance may influence directly or indirectly her/his emotional states. Consequently, when completing the syllogistic task, a participant would not have automatically the goal to accomplish well that task. In the same time, she/he would have also the goal to accomplish her/his current emotion regulation goal, which may be in competition with the goal of succeeding in the syllogistic task.

Finally, a third theoretical possibility is that some general abilities may be involved both in the successful solving of the emotion regulation problem and in the successful solving of the deductive task, as it was also mentioned before. Such general common causal factors especially relevant for the current research would be general intelligence, an autonomous thinking style or the motivational orientation toward autonomy, which may be associated both with the deductive thinking abilities, as suggested by the exploratory data from Faiciuc's study (2009, 2017), and with the level of autonomy of the emotion regulation goals, leading, therefore, to associations between them.

METHOD

***Participants*:** A total number of 91 first year students at the University of Fine Arts and Design from Cluj-Napoca (mean age: 20 years, 68 females, 20 males, 3 without a specified gender). The number of participants may vary for each computed correlation, depending on the number of participants who gave answers for all the items used to compute the correlated scores.

***Instruments*:**

– A **written categorical syllogism task** (see Appendix 2), elaborated by the present author, with 24 categorical syllogisms with an abstract symbolic content, 12 of them being valid syllogisms, and 12 invalid syllogisms, distributed in an interspersed way. Of the 24 syllogisms, eight were figure 1 syllogisms, eight were figure 2 syllogisms, and eight were figure 3 syllogisms, presented in the above mentioned order of the syllogistic figures. The task was presented in two versions for each participant, described in the introductory part of this study. For each syllogism, the requirement was to determine the conclusion that can be validly inferred based on the two given premises, by choosing from several predefined response options. In the first version of the syllogistic task (**E** version), there were five predefined response options (the four types of judgments **A**, **I**, **E**, **O,** between the two extreme syllogistic terms, placed in the same order, and the "no valid conclusion" option), and, in the second version of the task (**M** version), there were nine predefined response options (the four types of judgments **A**, **I**, **E**, **O,** between the two extreme syllogistic terms, placed in the same order, each of them having a first version, expressing an intensional relationship, and a second version,

expressing an extensional relationship, and the "no valid conclusion" option). The instruction was rather short and simple, assuming an implicit understanding of the task.

– Self-Regulation of Withholding Negative Emotions Questionnaire (SRWNE), translated in Romanian by the author of this research (see Appendix 1), elaborated by Kim et al. (2002). The psychometric properties (validity and reliability) of its English version were presented in detail by Kim et al. (2002). The α coefficients for the internal consistency of the four scales were, in their studies, between .67 and .78, and the 8-week test-retest reliability coefficients were greater than .61 ($p < .001$). The instrument has four scales: *external emotion regulation* (7 items), *introjected emotion regulation* (8 items), *identified emotion regulation* (8 items), and *integrated emotion regulation* (5 items). The answer for each of the 28 items is given on a seven-point Likert scale (from 1: "strongly disagree" to 7 "strongly agree").

***Procedure*:** The syllogistic task in its two versions and SRWNE questionnaire were administered collectively and successively, without a break between them, within the same session of examination, first the syllogistic task in the two versions and then the SRWNE questionnaire. There was no time limit. The participants were randomly distributed (based on their place, i.e. if it was with an odd or even number) in two relatively equal groups. In one of them, the administration order for the two versions of the syllogistic task was **EM**, and, in the other one, it was **ME**. There was no training phase for the syllogistic task. The participants were required to write on the completion forms a pseudonym at their choice instead of their names, in order to secure the confidentiality of their results and to discourage any tendency to copy the answers from their neighbours. In order to be motivated supplementarily (i.e., not only by gaining credit points), the participants were told that, based on their pseudonym, they can find out, at their request, the obtained correctness score. For the syllogistic task, a total correctness score was computed for each version, and, because the previous research (i.e., Faiciuc, 2009, 2017) indicated that the reasoning processes involved in solving valid syllogisms overlap only partially with the ones involved in solving invalid syllogisms, a separate score was computed for the correctness of the valid and invalid syllogisms, respectively. Also, taking into consideration the classical distinction between the one-model syllogisms and the multiple-model syllogisms, a separate score was computed for the correctness of the one-model syllogisms (which are all valid syllogisms), and a score for the valid multiple-model syllogisms. Invalid syllogisms are all multiple-model syllogisms. For the case of the valid syllogisms of the **M** version of the syllogistic task, there was also computed a concordance score, given by the number of logically correct answers for which the chosen version was concordant with the mixed semantic model suggested by Didilescu and Botezatu (1976), and a relative concordance score, as a ratio between the concordance score and the correctness score for the valid

syllogisms. This score indicates, based on theoretical reasons (see Faiciuc, 2009, 2017), as mentioned before, a participant's sensitivity to the logical form of the assumed syllogistic schemata, being useful in order to control the results obtained for the correctness of valid syllogisms in the **M** version of the syllogistic task, bringing evidence to support the hypothesis that they were not obtained purely by chance, or mainly because of other factors than the one involving the recognition of the syllogistic schemata prescribed by the mixed semantic model through the help of the provided linguistic cues. For the SWRNE questionnaire, there were computed a score for each of the four scale (as a mean of the answers given for the items from that scale), an index for the controlled emotion regulation (as a sum of the standard scores – *z* scores - for the external and introjected emotion regulation scales), an index for the autonomous regulation (as a sum of the standard scores – *z* – scores - for the identified and integrated emotion regulation scales), and an index for the relative autonomy (as a difference between the autonomous regulation index and the controlled regulation index).

RESULTS

Data indicated a relatively good internal consistency of the SRWNE scales of its present Romanian version, with the exception of the integrated regulation scale (the one that has the lowest number of items, i.e. only 5 items). The α coefficients for the internal consistency were: .70 (for the external emotion regulation scale and identified emotion regulation scale), .71 (for the introjected emotion regulation scale), .61 (for the integrated emotion regulation scale). The integrated emotion regulation scale had the lowest internal consistency maybe because it has the fewest items (5), because the answers for one of its items (the 8th one) had lower (and the lowest) statistically significant positive correlations with the answers for the other items of the scale and with the score for the entire scale, whereas it correlated positively significantly also with the scores of two scales for the controlled emotion regulation (when no correlation or a negative correlation was expected), and because its content ("I enjoy being aware of my feelings, but I also find it satisfying to maintain a positive outward appearance.") seems ambiguous, comprising two different ideas apparently. By removing that item, the internal consistency of the integrated emotion regulation scale was somewhat improved (α coefficient was .64). Because that improvement was rather low, in almost all the following data analyses, all the initial items of that scale were used. The score for its version with that item removed will be used only for the interpretation of the obtained data. No statistically significant gender differences were found regarding the computed scores. As most of the variables involved in the research had a non-normal distribution, the nonparametric Spearman rank correlation was used (one-tailed, given the unidirectional predictions).

Because a statistically significant positive correlation between the controlled emotion regulation index and the autonomous regulation index was obtained (ρ = .383, p <.001, N =81, one-tailed, for the entire sample, ρ = .386, p = .008, N =39, one-tailed, in the **EM** group, and ρ = .383, p = .006, N =42, one-tailed, in the **ME** group), when no relationship or a negative correlation was predictable on theoretical grounds, maybe as a consequence of the fact that some answers given to items from each scale correlated statistically significantly with the scores for all the four scales, and of the fact that there were found statistically significant negative correlations or tendencies toward such a negative correlation between some of the computed syllogistic scores and the mean for all the answers given for the SRWNE in the case of the entire sample[1] (ρ = -.254, p = .023, N = 80, two-tailed, for the valid syllogisms in the **E** version of the syllogistic task, a correlation that was mostly generated by the multiple-model valid syllogisms: ρ = -.266, p = .017, N = 80, two-tailed; ρ = -.194, p = .082, N = 81, two-tailed, for the valid syllogisms of the **M** version of the syllogistic task), the possibility of a response tendency for the SRWNE could not be excluded. That is why, all the following computations were made using also an ipsatized version of the scores computed for the SRWNE, i.e. taking into consideration the relative value of an answer, not its absolute value. Those scores were obtained by subtracting the answer for an item from the general mean of the answers given for all the items of the SRWNE, and then proceeding in the same way as in the case of the non-ipsatized scores. Analyzing if the response tendency (the mean of all SWRNE answers) is particularly associated with the ipsatized scores computed for the four scales of SRWNE, there was found a significant negative correlation between that mean and the ipsatized score for the integrated emotion regulation (ρ = -.237, p = .033, N = 80, two-tailed), and no significant relationship with the scores of the remaining scales. After ipsatization, the correlation between the ipsatized score for the controlled emotion regulation and the one for the autonomous emotion regulation was ρ = -.996, p < .001, N = 81, one-tailed.

Given that, with only one exception (the one of the invalid syllogisms of the **M** version of the syllogistic task), no statistically significant differences occurred in what respects the main correctness scores for the **M** and **E** versions of the syllogistic task in the two groups for which the two versions were administered in a different order, in what follows, the relevant correlations were computed not only

[1] In the case of the group with the administration order **EM**: the mean of all the answers for SRWNE tended to correlate negatively with the correctness for the valid syllogisms of the **E** version of the syllogistic task (ρ = -.285, p = .078, N = 39, two-tailed), and with the correctness for the multiple-model valid syllogisms of the **E** version of the syllogistic task (ρ = -.295, p = .065, N = 39, two-tailed), whereas in the case of the group with the administration order **ME,** the mean of all the answers for SRWNE tended to correlate negatively with the correctness for the valid syllogisms of the **M** version of the syllogistic task (ρ = -.297, p = .056, N = 42, two-tailed), particularly with the one-model ones (ρ = -.347, p = .024, N = 42, two-tailed), and with the correctness for the multiple-model valid syllogisms of the **E** version of the syllogistic task (ρ = -.257, p = .105, N = 41, two-tailed).

for each of the two groups separately, but also for the entire sample. Because, as it was also mentioned before, the reasoning processes for the one-model and multiple-model valid syllogisms may be different from each other and different from the ones involved in solving the invalid syllogisms, the correlations relevant for the proposed hypotheses were also computed for the correctness of the one-model, multiple-model valid syllogisms, and, respectively, invalid syllogisms, separately, as an exploratory undertaking. This exploratory undertaking was completed with the analysis of the correlations between the SRWNE scores and the two computed concordance scores (absolute and relative) of the correct answers for the valid syllogisms in the **M** version of the syllogistic task, scores that presumably indicate the sensitivity to the mixed semantic model proposed by Didilescu and Botezatu (1976) for the valid syllogisms.

The chosen statistical significance threshold was $p = .05$. As the present data analysis has a notable exploratory character, Bonferroni correction was not used, taking into account also that its application is controversial, especially in such cases (Streiner, 2015).

The main results are presented in the Tables 1-15.

Finally, in what respects the association between the relative concordance score at the syllogistic task in its **M** version and the SRWNE scores, the following statistically significant correlations or trends or were obtained for the entire sample:

- with the integrated emotion regulation score (non-ipsatized score: $\rho = .158$, $p = .074$, $N = 85$, one-tailed; ipsatized score: $\rho = .159$, $p = .078$, $N = 81$, one-tailed);
- with the introjected emotion regulation score (ipsatized score: $\boldsymbol{\rho = -.222}$, $p = .023$, $N = 81$, one-tailed);
- with the identified emotion regulation score (ipsatized score: $\rho = .15$, $p = .09$, $N = 81$, one-tailed);
- with the autonomous emotion regulation composite score (non-ipsatized score: $\rho = .156$, $p = .077$, $N = 85$, one-tailed; ipsatized score: $\boldsymbol{\rho = .199}$, $p = .037$, $N = 81$, one-tailed);
- with the controlled emotion regulation composite score (ipsatized score: $\boldsymbol{\rho = -.203}$, $p = .034$, $N = 81$, one-tailed);
- with the composite score of the relative autonomy in emotion regulation (non-ipsatized score: $\boldsymbol{\rho = .193}$, $p = .042$, $N = 85$, one-tailed; ipsatized score: $\boldsymbol{\rho = .202}$, $p = .035$, $N = 81$, one-tailed).

Table 1

Rank correlations between the total correctness at the **M** and, respectively, **E** version of the syllogistic task and the computed scores of the SRWNE, assessing types of emotion regulation goals, *in the group with the administration order **EM***

Scores of the SRWNE assessing types of emotion regulation goals	**Total correctness for the E version of the syllogistic task**		**Total correctness for the M version of the syllogistic task**	
	Non-ipsatized scores for SRWNE	**Ipsatized scores for SRWNE**	**Non-ipsatized scores for SRWNE**	**Ipsatized scores for SRWNE**
External emotion regulation	**ρ = -.331**, p = .02, N = 39	ρ = -.195, p = .118, N = 39	**ρ = -.312**, p = .027, N = 39	ρ = -.175, p = .144, N = 39
Introjected emotion regulation	ρ = -.202, p = .103, N = 41	ρ = *-.246*, p = .066, N = 39	**ρ = -.309**, p = .025, N = 41	**ρ = -.41**, p = .005, N = 39
Identified emotion regulation	ρ = .043, p = .394, N = 42	ρ = .210, p = .100, N = 39	ρ = .01, p = .475, N = 42	ρ = .156, p = .171, N = 39
Integrated emotion regulation	ρ = .153, p = .173, N = 40	**ρ = .316**, p = .025, N = 39	**ρ = .384**, p = .007, N = 40	**ρ = .523**, p < .001, N = 39
Controlled emotion regulation index	**ρ = -.313**, p = .026, N = 39	**ρ = -.377**, p = .009, N = 39	**ρ = -.344**, p = .016, N = 39	**ρ = -.464**, p = .001, N = 39
Autonomous emotion regulation index	ρ = .096, p = .279, N = 40	**ρ = .383**, p = .008, N = 39	ρ = .198, p = .140, N = 40	**ρ = .477**, p = .001, N = 39
Index for the relative autonomy in emotion regulation	**ρ = .365**, p = .011, N = 39	**ρ = .379**, p = .009, N = 39	**ρ = .473**, p = .001, N = 39	**ρ = .470**, p = .001, N = 39

Table 2

Rank correlations between the total correctness at the **M** and, respectively, **E** version of the syllogistic task and the computed scores of the SRWNE, assessing types of emotion regulation goals, *in the group with the administration order **ME***

Scores of the SRWNE assessing types of emotion regulation goals	**Total correctness for the M version of the syllogistic task**		**Total correctness for the E version of the syllogistic task**	
	Non-ipsatized scores for SRWNE	**Ipsatized scores for SRWNE**	**Non-ipsatized scores for SRWNE**	**Ipsatized scores for SRWNE**
External emotion regulation	**ρ = -.275**, p = .032, N = 46	**ρ = -.372**, p = .008, N = 42	ρ = -.148, p = .167, N = 45	**ρ = -.280**, p = .038, N = 41
Introjected emotion regulation	ρ = -.181, p = .122, N = 43	ρ = -.082, p = .304, N = 42	ρ = -.092, p = .281, N = 42	ρ = -.048, p = .383, N = 41
Identified emotion regulation	ρ = .109, p = .235, N = 46	**ρ = .377,** p = .007, N = 42	ρ = .130, p = .198, N = 45	**ρ = .319**, p = .021, N = 41
Integrated emotion regulation	ρ = .04, p = .397, N = 45	ρ = .128, p = .209, N = 42	ρ = .078, p = .308, N = 44	ρ = .07, p = .332, N = 41
Controlled emotion regulation index	*ρ = -.243*, p = .058, N = 43	**ρ = -.339, p = .014,** N = 42	ρ = -.161, p = .154, N = 42	**ρ = -.271**, p = .043, N = 41
Autonomous emotion regulation index	ρ = .069, p = .325, N = 45	**ρ = .347**, p = .012, N = 42	ρ = .116, p = .226, N = 44	**ρ = .274**, p = .041, N = 41
Index for the relative autonomyin emotion regulation	**ρ = .351**, p = .011, N = 42	**ρ = .347**, p = .012, N = 42	**ρ = .261**, p = .05, N = 41	**ρ = .278**, p = .039, N = 41

Table 3

Rank correlations between the total correctness at the **M** and, respectively, **E** versions of the syllogistic task and the computed scores of the SRWNE, assessing types of emotion regulation goals, *in the entire sample*

Scores of the SRWNE assessing types of emotion regulation goals	**Total correctness for the E version of the syllogistic task**		**Total correctness for the M version of the syllogistic task**	
	Non-ipsatized scores for SRWNE	**Ipsatized scores for SRWNE**	**Non-ipsatized scores for SRWNE**	**Ipsatized scores for SRWNE**
External emotion regulation	**ρ = -.231**, p = .017, N = 84	**ρ = -.236**, p = .018, N = 80	**ρ = -.281**, p = .005, N = 85	**ρ = -.254**, p = .011, N = 81
Introjected emotion regulation	ρ = -.135, p = .111, N = 83	ρ = *-.146*, p = .098, N = 80	**ρ = -.284**, p = .011, N = 84	**ρ = -.267**, p = .008, N = 81
Identified emotion regulation	ρ = .091, p = .201, N = 87	**ρ = .262**, p = .009, N = 80	ρ = .066, p = .271, N = 88	ρ = **.272**, p = .007, N = 81
Integrated emotion regulation	ρ = .107, p = .166, N = 84	**ρ = .188**, p = .048, N = 80	**ρ = .216**, p = .024, N = 85	**ρ = .337**, p = .001, N = 81
Controlled emotion regulation index	**ρ = -.224**, p = .022, N = 81	**ρ = -.301**, p = .003, N = 80	**ρ = -.276**, p = .006, N = 82	**ρ = -.396**, p < .001, N = 81
Autonomous emotion regulation index	ρ = .119, p = .141, N = 84	**ρ = .307**, p = .003, N = 80	ρ = *.159*, p = .074, N = 84	**ρ = .404** p < .001, N = 81
Index for the relative autonomy in emotion regulation	**ρ = .296**, p = .004, N = 80	**ρ = .306**, p = .003, N = 80	**ρ = .402**, p < .001, N = 81	**ρ = .403**, p < .001, N = 81

Table 4

Rank correlations between the correctness for the *valid syllogisms* at the **M** and, respectively, **E** version of the syllogistic task and the computed scores of the SRWNE, assessing types of emotion regulation goals, *in the group with the administration order **EM***

Scores of the SRWNE assessing types of emotion regulation goals	**Correctness of the valid syllogisms for the E version of the syllogistic task**		**Correctness of the valid syllogisms for the M version of the syllogistic task**	
	Non-ipsatized scores for SRWNE	**Ipsatized scores for SRWNE**	**Non-ipsatized scores for SRWNE**	**Ipsatized scores for SRWNE**
External emotion regulation	**ρ = -.299**, p = .032, N = 39	ρ = -.111, p = .250, N = 39	**ρ = -.270**, p = .048, N = 39	ρ = -.203, p = .108, N = 39
Introjected emotion regulation	**ρ = -.299**, p = .029, N = 41	ρ = -.182, p = .133, N = 39	*ρ = -.213*, p = .091, N = 41	ρ = -.207, p = .102, N = 39
Identified emotion regulation	ρ = -.113, p = .239, N = 42	ρ = .145, p = .189, N = 39	ρ = -.037, p = .409, N = 42	ρ = .027, p = .435, N = 39
Integrated emotion regulation	ρ = .087, p = .297, N = 40	**ρ = .376**, p = .009, N = 39	*ρ = .260*, p = .052, N = 85	**ρ = .429**, p = .003, N = 39
Controlled emotion regulation index	**ρ = -.338**, p = .018, N = 39	*ρ = -.252*, p = .061, N = 39	*ρ = -.264*, p = .052, N = 39	**ρ = -.308**, p = .028, N = 39
Autonomous emotion regulation index	ρ = -.048, p = .384, N = 40	**ρ = .269**, p = .049, N = 39	ρ = .069, p = .336, N = 40	**ρ = .328**, p = .021, N = 39
Index for the relative autonomy in emotion regulation	*ρ = .257*, p = .057, N = 39	*ρ = .261*, p = .055, N = 39	**ρ = .332**, p = .019, N = 39	**ρ = .318**, p = .024, N = 39

Table 5

Rank correlations between the correctness for the *valid syllogisms* at the **M** and, respectively, **E** version of the syllogistic task and the computed scores of the SRWNE, assessing types of emotion regulation goals, *in the group with the administration order* ***ME***

Scores of the SRWNE assessing types of emotion regulation goals	**Correctness of the valid syllogisms for the M version of the syllogistic task**		**Correctness of the valid syllogisms for the E version of the syllogistic task**	
	Non-ipsatized scores for SRWNE	**Ipsatized scores for SRWNE**	**Non-ipsatized scores for SRWNE**	**Ipsatized scores for SRWNE**
External emotion regulation	**ρ = -.438**, p = .001, N = 46	**ρ = -.383**, p = .006, N = 42	**ρ = -.278**, p = .032, N = 45	**ρ = -.283**, p = .037, N = 41
Introjected emotion regulation	**ρ = -.376**, p = .006, N = 43	ρ = -.120, p = .225, N = 42	ρ = -.152, p = .169, N = 42	ρ = -.12, p = .471, N = 41
Identified emotion regulation	ρ = -.002, p = .496, N = 46	**ρ = .41**, p = .003, N = 42	ρ = .084, p = .292, N = 45	**ρ = .353,** p = .012, N = 41
Integrated emotion regulation	ρ = -.098, p = .26, N = 45	ρ = .116, p = .232, N = 42	ρ = -.149, p = .168, N = 44	ρ = -.153, p = .169, N = 41
Controlled emotion regulation index	**ρ = -.445,** p = .001, N = 43	**ρ = -.373,** p = .008, N = 42	*ρ = -.238*, p = .065, N = 42	*ρ = -.223*, p = .081, N = 41
Autonomous emotion regulation index	ρ = -.069, p = .239, N = 45	**ρ = .379**, p = .007, N = 42	ρ = -.044, p = .388, N = 44	*ρ = .227*, p = .076, N = 41
Index for the relative autonomy in emotion regulation	**ρ = .368**, p = .008, N = 42	**ρ = .379**, p = .007, N = 42	ρ = .183, p = .126, N = 41	*ρ = .227*, p = .076, N = 41

Table 6

Rank correlations between the correctness for the *valid syllogisms* at the **M** and, respectively, **E** version of the syllogistic task and the computed scores of the SRWNE, assessing types of emotion regulation goals, *in the entire sample*

Scores of the SRWNE assessing types of emotion regulation goals	**Correctness of the valid syllogisms for the E version of the syllogistic task**		**Correctness of the valid syllogisms for the M version of the syllogistic task**	
	Non-ipsatized scores for SRWNE	**Ipsatized scores for SRWNE**	**Non-ipsatized scores for SRWNE**	**Ipsatized scores for SRWNE**
External emotion regulation	**ρ = -.306**, p = .002, N = 84	**ρ = -.220**, p = .025, N = 80	**ρ = -.362**, p < .001, N = 85	**ρ = -.297**, p = .004, N = 81
Introjected emotion regulation	**ρ = -.242**, p = .014, N = 83	ρ = -.109, p = .168, N = 80	**ρ = -.265**, p = .007, N = 84	*ρ = -.148*, p = .093, N = 81
Identified emotion regulation	ρ = .019, p = .432, N = 87	**ρ = .262**, p = .009, N = 80	ρ = .016, p = .441, N = 88	**ρ = .215**, p = .027, N = 81
Integrated emotion regulation	ρ = -.032, p = .387, N = 84	ρ = .115, p = .155, N = 80	ρ = .088, p = .212, N = 85	**ρ = .275**, p = .006, N = 81
Controlled emotion regulation index	**ρ = -.304**, p = .003, N = 81	**ρ = -.245**, p = .014, N = 80	**ρ = -.330**, p = .001, N = 82	**ρ = -.327**, p = .001, N = 81
Autonomous emotion regulation index	ρ = .041, p = .354, N = 84	**ρ = .252**, p = .012, N = 80	ρ = .021 p = .426, N = 85	**ρ = .340** p = .001, N = 81
Index for the relative autonomy in emotion regulation	**ρ = .232**, p = .019, N = 80	**ρ = .291**, p = .004, N = 80	**ρ = .337**, p = .001, N = 81	**ρ = .397**, p < .001, N = 81

Table 7

Rank correlations between the correctness for the *invalid syllogisms* at the **M** and, respectively, **E** version of the syllogistic task and the computed scores of the SRWNE, assessing types of emotion regulation goals, *in the group with the administration order **EM***

Scores of the SRWNE assessing types of emotion regulation goals	**Correctness of the invalid syllogisms for the E version of the syllogistic task**		**Correctness of the invalid syllogisms for the M version of the syllogistic task**	
	Non-ipsatized scores for SRWNE	**Ipsatized scores for SRWNE**	**Non-ipsatized scores for SRWNE**	**Ipsatized scores for SRWNE**
External emotion regulation	ρ = -.195, p = .117, N = 39	ρ = -.086, p = .301, N = 39	ρ = *-.212*, p = .097, N = 39	ρ = -.008, p = .48, N = 39
Introjected emotion regulation	ρ = -.089, p = .291, N = 41	ρ = *-.22*, p = .087, N = 39	**ρ = -.295**, p = .031, N = 41	**ρ = -.409**, p = .005, N = 39
Identified emotion regulation	ρ = .093, p = .279, N = 42	ρ = .069, p = .339, N = 39	ρ = .007, p = .483, N = 42	ρ = .158, p = .168, N = 39
Integrated emotion regulation	ρ = .178, p = .137, N = 40	ρ = .204, p = .106, N = 39	**ρ = .312**, p = .025, N = 40	**ρ = .376**, p = .009, N = 39
Controlled emotion regulation index	ρ = -.155, p = .174, N = 39	**ρ = -.278**, p = .043, N = 39	**ρ = -.273**, p = .047, N = 39	**ρ = -.353**, p = .014, N = 39
Autonomous emotion regulation index	ρ = .145, p = .187, N = 40	**ρ = .280**, p = .042, N = 39	ρ = .184, p = .127, N = 40	**ρ = .355**, p = .013, N = 39
Index for the relative autonomy in emotion regulation	**ρ = .271**, p = .047, N = 39	**ρ = .280**, p = .042, N = 39	**ρ = .344**, p = .016, N = 39	**ρ = .355**, p = .013, N = 39

Table 8

Rank correlations between the correctness for the *invalid syllogisms* at the **M** and, respectively, **E** version of the syllogistic task and the computed scores of the SRWNE, assessing types of emotion regulation goals, *in the group with the administration order **ME***

Scores of the SRWNE assessing types of emotion regulation goals	**Correctness of the invalid syllogisms for the M version of the syllogistic task**		**Correctness of the invalid syllogisms for the E version of the syllogistic task**	
	Non-ipsatized scores for SRWNE	**Ipsatized scores for SRWNE**	**Non-ipsatized scores for SRWNE**	**Ipsatized scores for SRWNE**
External emotion regulation	ρ = .078, p = .303, N = 46	ρ = -.142, p = .184, N = 42	ρ = .083, p = .294, N = 45	ρ = -.113, p = .242, N = 41
Introjected emotion regulation	ρ = .115, p = .232, N = 43	ρ = -.018, p = .455, N = 42	ρ = .017, p = .458, N = 42	ρ = -.068, p = .337, N = 41
Identified emotion regulation	ρ = .151, p = .158, N = 46	ρ = .085, p = .297, N = 42	ρ = .122, p = .212, N = 45	ρ = .108, p = .251, N = 41
Integrated emotion regulation	ρ = *.230*, p = .064, N = 45	ρ = .143, p = .184, N = 42	**ρ = .298**, p = .025, N = 44	ρ = *.251*, p = .07, N = 41
Controlled emotion regulation index	ρ = .107, p = .248, N = 43	ρ = -.118, p = .228, N = 42	ρ = .016, p = .462, N = 42	ρ = -.158, p = .163, N = 41
Autonomous emotion regulation index	ρ = *.196*, p = .098, N = 45	ρ = -.124, p = .217, N = 42	ρ = *.249*, p = .051, N = 44	ρ = .158, p = .162, N = 41
Index for the relative autonomy in emotion regulation	ρ = .150, p = .171, N = 42	ρ = .122, p = .22, N = 42	ρ = .183, p = .126, N = 41	ρ = .163, p = .154, N = 41

Table 9

Rank correlations between the correctness for the *invalid syllogisms* at the **M** and, respectively, **E** version of the syllogistic task and the computed scores of the SRWNE, assessing types of emotion regulation goals, *in the entire sample*

Scores of the SRWNE assessing types of emotion regulation goals	**Correctness of the invalid syllogisms for the E version of the syllogistic task**		**Correctness of the invalid syllogisms for the M version of the syllogistic task**	
	Non-ipsatized scores for SRWNE	**Ipsatized scores for SRWNE**	**Non-ipsatized scores for SRWNE**	**Ipsatized scores for SRWNE**
External emotion regulation	ρ = -.023, p = .416, N = 84	ρ = -.079, p = .243, N = 80	ρ = -.041, p = .355, N = 85	ρ = -.029, p = .397, N = 81
Introjected emotion regulation	ρ = -.003, p = .490, N = 83	ρ = *-.148*, p = .095, N = 80	ρ = -.114, p = .150, N = 84	**ρ = -.252**, p = .011, N = 81
Identified emotion regulation	ρ = .119, p = .137, N = 87	ρ = .085, p = .226, N = 80	ρ = .089, p = .204, N = 88	ρ = .136, p = .114, N = 81
Integrated emotion regulation	**ρ = .235**, p = .016, N = 84	**ρ = .219**, p = .026, N = 80	**ρ = .265**, p = .007, N = 85	**ρ = .26**, p = .01, N = 81
Controlled emotion regulation index	ρ = -.043, p = .350, N = 81	**ρ = -.192**, p = .044, N = 80	ρ = -.078, p = .243, N = 82	**ρ = -.225**, p = .022, N = 81
Autonomous emotion regulation index	**ρ = .219**, p = .023, N = 84	**ρ = .201,** p = .037, N = 80	**ρ = .213**, p = .025, N = 84	**ρ = .233,** p = .018, N = 81
Index for the relative autonomy in emotion regulation	**ρ = .207**, p = .033, N = 80	**ρ = .196,** p = .041, N = 80	**ρ = .237**, p = .017, N = 81	**ρ = .230**, p = .019, N = 81

Table 10

Rank correlations between *the concordance score of the correct answers for the valid syllogisms* in the **M** version of the syllogistic task and the computed scores of the SRWNE, assessing types of emotion regulation goals, *in the two groups with a different administration order and in the entire sample*

Scores of the SRWNE assessing types of emotion regulation goals	**Concordance score in the EM group**		**Concordance score in the ME group**		**Concordance score in the entire sample**	
	Non-ipsatized scores	**Ipsatized scores**	**Non-ipsatized scores**	**Ipsatized scores**	**Non-ipsatized scores**	**Ipsatized scores**
External emotion regulation	ρ = *-.266*, p = .051, N = 39	ρ = -.133, p = .21, N = 39	**ρ = -.311**, p = .016, N = 46	**ρ = -.366**, p = .009, N = 42	**ρ = -.29**, p = .004, N = 85	**ρ = -.245**, p = .014, N = 81
Introjected emotion regulation	**ρ = -.295**, p = .030, N = 41	**ρ = -.454**, p = .002, N = 39	**ρ = -.279**, p = .035, N = 43	ρ = -.186, p = .199, N = 42	**ρ = -.277**, p = .005, N = 84	**ρ = -.320**, p = .002, N = 81
Identified emotion regulation	ρ = .056, p = .363, N = 42	ρ = .089, p = .294, N = 39	ρ = .116, p = .22, N = 46	**ρ = .459**, p = .001, N = 42	ρ = .083, p = .222, N= 88	**ρ = .268**, p = .008, N= 81
Integrated emotion regulation	**ρ = .421**, p = .003, N = 40	**ρ = .508**, p < .001, N = 39	ρ = .02, p = .448, N = 45	ρ = .170, p = .141, N = 42	**ρ = .213**, p = .025, N = 85	**ρ = .337**, p = .001, N = 81
Controlled emotion regulation index	**ρ = -.332**, p = .023, N = 39	**ρ = -.483**, p = .001, N = 39	**ρ = -.317**, p = .019, N = 43	**ρ = -.393**, p = .005, N = 42	**ρ = -.308**, p = .002, N = 82	**ρ = -.430**, p < .001, N = 81
Autonomous emotion regulation index	ρ = *.258*, p = .064, N = 40	**ρ = .437**, p = .003, N = 39	ρ = -.055, p = .36, N = 45	**ρ = .425**, p = .003, N = 42	ρ = *.169*, p = .061, N = 85	**ρ = .413**, p < .001, N = 81
Index for the relative autonomy in emotion regulation	**ρ = .485**, p = .001, N = 39	**ρ = .431**, p = .003, N = 39	**ρ = .392**, p = .005, N = 42	**ρ = .425**, p = .002, N = 42	**ρ = .43**, p < .001, N = 81	**ρ = .411**, p < .001, N = 81

Table 11

Rank correlations between the correctness for the *one-model valid syllogisms* at the **M** and, respectively, **E** version of the syllogistic task and the computed scores of the SRWNE, assessing types of emotion regulation goals, *in the group with the administration order **EM***

Scores of the SRWNE assessing types of emotion regulation goals	**One-model valid syllogisms for the E version of the syllogistic task**		**One-model valid syllogisms for the M version of the syllogistic task**	
	Non-ipsatized scores for SRWNE	**Ipsatized scores for SRWNE**	**Non-ipsatized scores for SRWNE**	**Ipsatized scores for SRWNE**
External emotion regulation	ρ = -.069, p = .338, N = 39	ρ = .104, p = .265, N = 39	ρ = -.167, p = .155, N = 39	ρ = *-.225*, p = .084, N = 39
Introjected emotion regulation	**ρ = -.278**, p = .039, N = 41	**ρ = -.327**, p = .021, N = 39	ρ = -.123, p = .221, N = 41	ρ = *-.218*, p = .091, N = 39
Identified emotion regulation	ρ = -.017, p = .458, N = 42	ρ = *.227*, p = .082, N = 39	ρ = .041, p = .397, N = 42	ρ = .091, p = .292 N = 39
Integrated emotion regulation	ρ = -.043, p = .395, N = 40	ρ = .134, p = .208, N = 39	**ρ = .269**, p = .046, N = 40	**ρ = .31**, p = .028, N = 39
Controlled emotion regulation index	ρ = *-.229*, p = .081, N = 39	ρ = -.197, p = .115, N = 39	ρ = -.151, p = .179, N = 39	**ρ = -.342**, p = .017, N = 39
Autonomous emotion regulation index	ρ = -.028, p = .432, N = 40	ρ = .195, p = .117, N = 39	ρ = .185, p = .127, N = 40	**ρ = .365** p = .011, N = 39
Index for the relative autonomy in emotion regulation	ρ = .164, p = .159, N = 39	ρ = .196, p = .116, N = 39	**ρ = .359**, p = .012, N = 39	**ρ = .354**, p = .013, N = 39

Table 12

Rank correlations between the correctness for the *one-model valid syllogisms* at the **M** and, respectively, **E** version of the syllogistic task and the computed scores of the SRWNE, assessing types of emotion regulation goals, *in the group with the administration order **ME***

Scores of the SRWNE assessing types of emotion regulation goals	**One-model valid syllogisms for the M version of the syllogistic task**		**One-model valid syllogisms for the E version of the syllogistic task**	
	Non-ipsatized scores for SRWNE	**Ipsatized scores for SRWNE**	**Non-ipsatized scores for SRWNE**	**Ipsatized scores for SRWNE**
External emotion regulation	**ρ = -.465**, p = .001, N = 46	**ρ = -.34**, p = .014, N = 42	ρ = *-.239*, p = .057, N = 45	ρ = *-.240*, p = .065, N = 41
Introjected emotion regulation	**ρ = -.405**, p = .004, N = 43	ρ = -.165, p = .148, N = 42	ρ = -.154, p = .165, N = 42	ρ = -.135, p = .199, N = 41
Identified emotion regulation	ρ = -.135, p = .186, N = 46	**ρ = .304**, p = .025, N = 42	ρ = .099, p = .26, N = 45	**ρ = .277**, p = .04, N = 41
Integrated emotion regulation	ρ = -.071, p = .323, N = 45	ρ = *.245*, p = .059, N = 42	ρ = .007, p = .483, N = 44	ρ = .025, p = .438, N = 41
Controlled emotion regulation index	**ρ = -.474**, p = .001, N = 43	**ρ = -.372**, p = .008, N = 42	ρ = *-.208*, p = .093, N = 42	**ρ = -.265**, p = .047, N = 41
Autonomous emotion regulation index	ρ = -.112, p = .231, N = 45	**ρ = .371**, p = .008, N = 42	ρ = .086 p = .29, N = 44	ρ = .270 p = .044, N = 41
Index for the relative autonomy in emotion regulation	**ρ = .361**, p = .009, N = 42	**ρ = .368**, p = .008, N = 42	ρ = .237, p = .68, N = 41	**ρ = .271**, p = .043, N = 41

Table 13

Rank correlations between the correctness for the *one-model valid syllogisms* at the **M** and, respectively, **E** version of the syllogistic task and the computed scores of the SRWNE, assessing types of emotion regulation goals, *in the entire sample*

Scores of the SRWNE assessing types of emotion regulation goals	**One-model valid syllogisms for the E version of the syllogistic task**		**One-model valid syllogisms for the M version of the syllogistic task**	
	Non-ipsatized scores for SRWNE	**Ipsatized scores for SRWNE**	**Non-ipsatized scores for SRWNE**	**Ipsatized scores for SRWNE**
External emotion regulation	*ρ = -.150*, *p* = .087, *N* = 84	ρ = -.063, *p* = .29, *N* = 80	**ρ = -.325**, *p* = .001, *N* = 85	**ρ = -.283**, *p* = .005, *N* = 81
Introjected emotion regulation	**ρ = -.210**, *p* = .028, *N* = 83	**ρ = -.212**, *p* = .03, *N* = 80	**ρ = -.244**, *p* = .013, *N* = 84	*ρ = -.172*, *p* = .062, *N* = 81
Identified emotion regulation	ρ = .033, *p* = .38, *N* = 87	**ρ = .246,** *p* = .014, *N* = 80	ρ = -.039, *p* = .357, *N* = 88	**ρ = .187,** *p* = .047, *N* = 81
Integrated emotion regulation	ρ = -.033, *p* = .384, *N* = 84	ρ = .051, *p* = .327, *N* = 80	ρ = .096, *p* = .191, *N* = 85	**ρ = .271**, *p* = .007, *N* = 81
Controlled emotion regulation index	**ρ = -.202**, *p* = .035, *N* = 81	**ρ = -.213**, *p* = .029, *N* = 80	**ρ = -.297**, *p* = .003, *N* = 82	**ρ = -.338**, *p* = .001, *N* = 81
Autonomous emotion regulation index	ρ = .022, *p* = .422, *N* = 84	**ρ = .207,** *p* = .033, *N* = 80	ρ = .049, *p* = .329, *N* = 85	**ρ = .346**, *p* = .001, *N* = 81
Index for the relative autonomy in emotion regulation	*ρ = .182*, *p* = .053, *N* = 80	**ρ = .212**, *p* = .03, *N* = 80	**ρ = .343**, *p*= .001, *N* = 81	**ρ = .343**, *p* = .001, *N* = 81

Table 14

Rank correlations between the correctness for *the multiple-model valid syllogisms* at the **M** and, respectively, **E** version of the syllogistic task and the computed scores of the SRWNE, assessing types of emotion regulation goals, *in the group with the administration order **EM***

Scores of the SRWNE assessing types of emotion regulation goals	**Multiple-model valid syllogisms for the E version of the syllogistic task**		**Multiple-model valid syllogisms for the M version of the syllogistic task**	
	Non-ipsatized scores for SRWNE	**Ipsatized scores for SRWNE**	**Non-ipsatized scores for SRWNE**	**Ipsatized scores for SRWNE**
External emotion regulation	***ρ* = -.370**, p = .01, N = 39	ρ = -.188, p = .126, N = 39	ρ = *-.256*, p = .058, N = 39	ρ = -.166, p = .156, N = 39
Introjected emotion regulation	***ρ* = -.287**, p = .035, N =41	ρ = -.089, p = .295, N = 39	ρ = -.169, p = .145, N = 41	ρ = -.135, p = .207, N = 39
Identified emotion regulation	ρ = -.164, p = .149, N = 42	ρ = .038, p = .408, N = 39	ρ = -.049, p = .378, N = 42	ρ = -.038, p = .409, N = 39
Integrated emotion regulation	ρ = .157, p = .167, N = 40	***ρ* = .442**, p = .002, N = 39	ρ = *.229*, p = .078, N = 40	***ρ* = .412**, p = .005, N = 39
Controlled emotion regulation index	***ρ* = -.374**, p = .015, N = 39	ρ = *-.217*, p = .093, N = 39	ρ = *-.244*, p = .067, N = 39	ρ = *-.214*, p =.096, N = 39
Autonomous emotion regulation index	ρ = -.072, p = .33, N = 40	ρ = *.241* p = .07, N = 39	ρ = .008, p = .482, N = 40	ρ = *.23*, p = .079, N = 39
Index for the relative autonomy in emotion regulation	ρ = *.24*, p = .071, N = 39	ρ = *.229*, p = .081, N = 39	ρ = *.242*, p = .069, N = 39	ρ = *.221*, p = .088, N = 39

Table 15

Rank correlations between the correctness for the *multiple-model valid syllogisms* at the **M** and, respectively, **E** version of the syllogistic task and the computed scores of the SRWNE, assessing types of emotion regulation goals, *in the group with the administration order **ME***

Scores of the SRWNE assessing types of emotion regulation goals	**Multiple-model valid syllogisms for the M version of the syllogistic task**		**Multiple-model valid syllogisms for the E version of the syllogistic task**	
	Non-ipsatized scores for SRWNE	**Ipsatized scores for SRWNE**	**Non-ipsatized scores for SRWNE**	**Ipsatized scores for SRWNE**
External emotion regulation	ρ = *-.223*, p = .068, N = 46	**ρ = -.303**, p = .026, N = 42	**ρ = -.248**, p = .05, N = 45	**ρ = -.274**, p = .042, N = 41
Introjected emotion regulation	ρ = -.186, p = .117, N = 43	ρ = -.115, p = .234, N = 42	ρ = -.126, p = .214, N = 42	ρ = .113, p = .24, N = 41
Identified emotion regulation	ρ = .162, p = .141, N = 46	**ρ = .398,** p = .005, N = 42	ρ = .038, p = .402, N = 45	**ρ = .321**, p = .02, N = 41
Integrated emotion regulation	ρ = .025, p = .434, N = 45	ρ = 0 p = .499, N = 42	ρ = *-.228*, p = .068, N = 44	ρ = *-.236*, p = .069, N = 41
Controlled emotion regulation index	ρ = *-.216*, p = .082, N = 43	**ρ = -.286**, p = .033, N = 42	ρ = *-.218*, p = .083, N = 42	ρ = -.136, p = .198, N = 41
Autonomous emotion regulation index	ρ = .079, p = .303, N = 45	**ρ = .298**, p = .028, N = 42	ρ = -.138, p = .187, N = 44	ρ = .137 p = .196, N = 41
Index for the relative autonomy in emotion regulation	**ρ = .29**, p = .031, N = 42	**ρ = .3**, p = .027, N = 42	ρ = .098, p = .271, N = 41	ρ = .135, p = .201, N = 41

Table 16

Rank correlations between the correctness for the *multiple-model valid syllogisms* at the **M** and, respectively, **E** version of the syllogistic task and the computed scores of the SRWNE, assessing types of emotion regulation goals, *in the entire sample*

Scores of the SRWNE assessing types of emotion regulation goals	**Multiple-model valid syllogisms for the E version of the syllogistic task**		**Multiple-model valid syllogisms for the M version of the syllogistic task**	
	Non-ipsatized scores for SRWNE	**Ipsatized scores for SRWNE**	**Non-ipsatized scores for SRWNE**	**Ipsatized scores for SRWNE**
External emotion regulation	**ρ = -.316**, p = .002, N = 84	**ρ = -.253**, p = .012, N = 80	**ρ = -.257**, p = .009, N = 85	**ρ = -.241**, p = .015, N = 81
Introjected emotion regulation	**ρ = -.205**, p = .032, N = 83	ρ = .01, p = .465, N = 80	*ρ = -.168*, p = .064, N = 84	ρ = -.097, p = .195, N = 81
Identified emotion regulation	ρ = -.064, p = .277, N = 87	*ρ = .180*, p = .055, N = 80	ρ = .041, p = .351, N = 88	**ρ = .193,** p = .042, N = 81
Integrated emotion regulation	ρ = -.028, p = .4, N = 84	ρ = .123, p = .138, N = 80	ρ = .087, p = .214, N = 85	**ρ = .189**, p = .045, N = 81
Controlled emotion regulation index	**ρ = -.287**, p = .005, N = 81	*ρ = -.169*, p = .067, N = 80	**ρ = -.222**, p = .023, N = 82	**ρ = -.241**, p = .015, N = 81
Autonomous emotion regulation index	ρ = -.095, p = .194, N = 84	*ρ = .154,* p = .051, N = 80	ρ = .04, p = .357, N = 85	**ρ = .254** p = .011, N = 81
Index for the relative autonomy in emotion regulation	*ρ = .174*, p = .061, N = 80	*ρ = .178,* p = .057, N = 80	**ρ = .252**, p =.012, N = 81	**ρ = .252**, p = .012, N = 81

For the **EM** administration order group, the relative concordance score at the syllogistic task in its **M** version had the following statistically significant correlations or trends of correlation with the SRWNE scores:

- with the integrated emotion regulation score (non-ipsatized score: ρ = *.243*, p = .066, N = 40, one-tailed; ipsatized score: ρ = *.256*, p = .058, N = 39, one-tailed);
- with the introjected emotion regulation score (non-ipsatized score: ρ = *-.208*, p = .096, N = 41, one-tailed; ipsatized score: ρ = **-.336**, p = .018, N = 39, one-tailed);
- with the controlled emotion regulation composite score (ipsatized score: ρ = *-.262*, p = .053, N = 39, one-tailed);
- with the autonomous emotion regulation composite score (ipsatized score: ρ = *.251*, p = .062, N = 39, one-tailed);
- with the composite score of the relative autonomy in emotion regulation (non-ipsatized score: ρ = *.25*, p = .062, N = 39, one-tailed; ipsatized score: ρ = *.258*, p = .057, N = 39).

Considering the distinction between the one-model valid syllogisms and multiple-model valid syllogisms, their relative concordance scores correlated or tended to correlate, in this group, with:

- the score for the integrated emotion regulation (**non-ipsatized scores**: ρ = *.25*, p = .06, N = 40, one-tailed, for *one-model syllogims*, $\boldsymbol{\rho}$ **= .437**, p = .003, N = 37, one-tailed, for *multiple-model syllogisms*; **ipsatized scores**: $\boldsymbol{\rho}$ **= .282**, p = .041, N = 39, one-tailed, for *one-model syllogims*, $\boldsymbol{\rho}$ **= .514**, p = .001, N = 36, one-tailed, for *multiple-model syllogisms*);
- the score for the introjected emotion regulation (**ipsatized scores:** ρ = *-.266*, p = .051, N = 39, one-tailed, for *one-model syllogims*, $\boldsymbol{\rho}$ **= -.318**, p = .029, N = 36, one-tailed, *for multiple-model syllogisms*);
- the composite score for the controlled emotion regulation (**ipsatized scores:** $\boldsymbol{\rho}$ **= -.294,** p = .034, N = 39, one-tailed, for *one-model syllogims*, $\boldsymbol{\rho}$ **= -.369**, p = .013, N = 36, one-tailed, for *multiple-model syllogisms*);
- the composite score for the autonomous emotion regulation (**ipsatized scores**: $\boldsymbol{\rho}$ **= .294**, p = .035, N = 39, one-tailed, for *one-model syllogims*, $\boldsymbol{\rho}$ **= .363**, p = .015, N = 36, one-tailed, for *multiple-model syllogisms*);
- the composite score for the relative autonomy in emotion regulation (**non-ipsatized scores**: $\boldsymbol{\rho}$ **= .301**, p = .031, N = 39, one-tailed, for *one-model syllogims*, $\boldsymbol{\rho}$ **= .451**, p = .003, N = 37, one-tailed, for *multiple-model syllogisms*; **ipsatized scores**: $\boldsymbol{\rho}$ **= .29**, p = .037, N = 39, one-tailed, for *one-model syllogims*, $\boldsymbol{\rho}$ **= .363**, p = .015, N = 36, one-tailed, for *multiple-model syllogisms*).

For the **ME** administration order group, the relative concordance score of the valid syllogisms at the syllogistic task in the **M** version had no statistically significant correlations or trends of correlations with the SRWNE scores. Considering the distinction between the one-model valid syllogisms and multiple-model valid syllogisms, their relative concordance scores correlated or tended to correlate, in this group, with:

- the score for the external emotion regulation (**non-ipsatized scores**: ρ = *-.193*, p = .099, N = 46, one-tailed, for *one-model syllogims*, ρ = *-.246*, p = .06, N = 41, one-tailed, for *multiple-model syllogisms*; **ipsatized scores**: ρ = **-.258**, p = .049, N = 42, one-tailed, for *one-model syllogims*, ρ = *-.222*, p = .094, N = 37, one-tailed, for *multiple-model syllogisms*);
- the score for the introjected emotion regulation (**non-ipsatized scores**: ρ = *-.218*, p = .08, N = 43, one-tailed, for *one-model syllogims*, ρ = *-.219*, p = .093, N = 38, one-tailed, for *multiple-model syllogisms*; **ipsatized scores**: ρ = *-.218*, p = .098, N = 37, one-tailed, for *multiple-model syllogisms*);
- the score for the identified emotion regulation (**ipsatized scores**: ρ = *.247*, p = .058, N = 42, one-tailed, for *one-model syllogisms,* $\boldsymbol{\rho}$ **= .321**, p = .026, N = 37, one-tailed, for *multiple-model syllogisms*);
- the composite score for the controlled emotion regulation (**non-ipsatized scores**: ρ = *-.252*, p = .052, N = 43, one-tailed, for *one-model syllogims*; **ipsatized scores**: ρ = **-.280**, p = .036, N = 42, one-tailed, for *one-model syllogims*, ρ = **-.312**, p = .03, N = 37, one-tailed, for *multiple-model syllogisms*);
- the composite score for the autonomous emotion regulation (**ipsatized scores**: $\boldsymbol{\rho}$ **= .283**, p = .035, N = 42, one-tailed, for *one-model syllogism*, $\boldsymbol{\rho}$ **= .299**, p = .036, N = 37, one-tailed, for *multiple-model syllogisms*);
- the composite score for the relative autonomy in emotion regulation (**non-ipsatized scores**: $\boldsymbol{\rho}$ **= .275**, p = .039, N = 42, one-tailed, for *one-model syllogims*, $\boldsymbol{\rho}$ **= .285**, p = .043, N = 37, one-tailed, for *multiple-model syllogisms*; **ipsatized scores**: $\boldsymbol{\rho}$ **= .285**, p = .034, N = 42, one-tailed, for *one-model syllogism*, $\boldsymbol{\rho}$ **= .297**, p = .037, N = 37, one-tailed, for *multiple-model syllogisms*).

DISCUSSION AND CONCLUSIONS

The general primary hypotheses were supported by data in a great extent, especially when these data were aggregated for the entire sample, for the total syllogistic performance, and for the composite scores of the SWRNE, but there were also particular cases in which the expected correlations were not obtained. So, when the types of syllogism were not taken into consideration, for the entire sample (see Table 3), the total correctness scores (ipsatised and non-ipsatized) correlated significantly positively, as expected, in a strong manner, with the composite score for the relative autonomy in emotion regulation both for the **M** and **E** versions of the syllogistic task (the significance thresholds being the lowest in the case of the **M** version of the syllogistic task). In the same time, total correctness scores correlated significantly positively, as expected, with the autonomous emotion regulation index, but only for the ipsatized scores, both for the **E** and **M** versions of the syllogistic task, the correlation being higher in the **M** version case. For the non-ipsatized scores, that positive correlation was only relatively close to the chosen statistical significance threshold, especially for the **M**

version of the syllogistic task. For the positive correlation between the composite scores for autonomy and the syllogistic performance, the most important contribution was the significant positive association, as expected, between the scores for the integrated emotion regulation and the total correctness score of the syllogistic task, which was not statistically significant only in the case of the non-ipsatized score of the **E** syllogistic task. In the same time, the expected positive correlation between the scores for the identified emotion regulation and the syllogistic performance was weaker, not reaching the chosen statistical significance threshold. Nevertheless, it was relatively close to that threshold, but only in the case of the ipsatized score of the scale for the identified emotion regulation. As expected, the negative correlation between the composite score of the controlled emotion regulation scale and the syllogistic performance was statistically significant in all the considered cases (non-ipsatiezed and ipsatized scores of the SWRNE scale, both for the **E** and **M** versions of the syllogistic task). To this correlation contributed the most the expected negative correlations between the scores for the external emotion regulation and the syllogistic performance, which was statistically significant in all the four considered cases (see above) and, in a lesser extent, the expected negative association between the scores for the introjected emotion regulation scale and the syllogistic performance, which was statistically significant solely for the **M** version of the syllogistic task (no matter the ipsatization), whereas, for the **E** version of the syllogistic task, that correlation was only a trend in the predicted direction.

The detailed analysis, by considering the two groups of participants in which the two versions of the syllogistic task were administered in a different order, revealed that, for the **EM** administration order (see Table 1), the expected correlations followed a similar pattern to the one obtained for the entire sample, with few exceptions: the expected negative correlation between the score for the external emotion regulation scale and the syllogistic performance was statistically significant, in this case, only for the non-ipsatized scores of the above-mentioned scale (for the ipsatized ones occurring only a very slight tendency for such a correlation), and, for those cases in which, for the entire sample, there occurred correlations relatively close to the chosen significance threshold, here, those correlations were, in general, relatively far from that threshold. For the **ME** administration order (see Table 2), instead, the pattern of the expected correlations was more dissimilar than the one obtained for the entire sample. In this case, the expected statistically significant correlations obtained for the entire sample between the syllogistic performance and the scores for the introjected, identified, and integrated emotion regulation scales disappeared altogether, and the expected significant negative correlation between the syllogistic performance and the scores for the external emotion regulation scale was lost in the case of the non-ipsatized scores of that scale in the **E** version of the syllogistic task. In what respects the composite scores, in the **ME** administration order case, in comparison with the entire sample case, the expected negative significant correlations between the syllogistic performance and the scores for the controlled emotion regulation were

lost for the non-ipsatized scores (remaining only as a tendency, as a correlation marginally significant, in the case of the **M** version of the syllogistic task), the expected positive significant correlations between the syllogistic performance and the scores for the autonomous emotion regulation disappeared completely (only a correlation relatively close to the chosen significance threshold was obtained for the ipsatized scores in the **M** version of the syllogistic task), whereas the expected significant positive correlations between the syllogistic performance and the scores for the relative autonomy in emotion regulation were almost entirely preserved, with only one exception: for the ipsatized scores, in the **E** version of the syllogistic task.

Speaking synthetically, the expected positive link between the syllogistic performance and the composite score for the relative autonomy in emotion regulation was apparently slightly stronger than the expected negative link between the syllogistic performance and the controlled emotion regulation, which, in its turn, was stronger than the expected positive link between the syllogistic performance and the autonomous emotion regulation. It is to be noted that the association between the syllogistic performance and the autonomous emotion regulation scores might have been affected by the lower internal consistency of the integrated emotion regulation score (for example, the correlation between the non-ipsatized score for the version of the integrated emotion regulation scale in which the above-mentioned item was removed and the total correctness in the **E** version of the syllogistic task was statistically significant: $\rho = .192$, $p = .04$, $N = 84$, one-tailed, for the entire sample, and, for the group with the **EM** administration order, it tended to be marginally significant: $\rho = .239$, $p = .069$, $N = 40$, one-tailed, whereas, for the initial scale, the correspondent correlations were not significant statistically).

The expected correlations were higher and occurred more frequently as statistically significant in the case of the **M** version of the syllogistic task (as predicted in the introductory part, if the hypothetical role of the argumentative experience is taken into consideration) and for those scales of SWRNE that were situated at the two extremes of the controlled-autonomous emotion regulation dimension, i.e. for those types of emotion regulation that are not close to the transition border between a controlled emotion regulation and an autonomous emotion regulation. In particular, the identified emotion regulation scale seems to be placed at the intersection point between the factors that promote a positive correlation between the emotion regulation goals and the syllogistic performance and those factors that promote a negative correlation between them (because at the level of this type of emotion regulation, external and internal factors might be more balanced in their influence on the choice of the emotion regulation goals). That may be why, for this scale, there were not obtained the predicted statistically significant correlations, with only a few exceptions, for particular conditions (certain types of syllogisms from a certain version of the syllogistic task, placed in a certain administration order). In general, stronger correlations occurred for the ipsatized scores, reflecting the relative preference attributed to the investigated types of emotion regulation, maybe because the expected correlations were not masked by external sources of variations that are associated with the absolute

preference for a type of emotion regulation (e.g., some response tendencies, which were partialled out through ipsatization). The expected significant correlations were obtained more frequently and clearly for the group in which the two versions of the syllogistic task were administered in the **EM** order than in the one in which they were administered in the **ME** order, reflecting the occurrence of some order effects, which will not be discussed here in detail, or, maybe, some random differences between the two groups of participants (in what regards the scales of the SWRNE, no statistically significant differences were obtained between the two groups). It is sufficing to say here that, in the **ME** administration order case, it may be that the association between the syllogistic performance and the autonomous style of emotion regulation (assessed with the four types of scores) was weaker than in the case of the **EM** administration order because the ceiling effect in solving the valid syllogisms (which reduces the variation of the syllogistic performance) might have been more frequent when the **M** version of the syllogistic task, which favors their solving through the provided linguistic cues, was administered first, i.e. when the mixed semantic interpretation of the syllogisms, presumably more favorable for the solving of the valid syllogisms, was not disturbed trough a carry-over effect by the exclusively extensional interpretation of the syllogisms promoted by the antecedent syllogistic task formulated in its **E** linguistic version. In the same time, correlatively, when the **M** version of the syllogistic task was administered after its **E** version, the positive correlation between the syllogistic performance and the autonomous emotion regulation might be explained less by invoking the differences between the number of syllogistic schemata acquired by those with higher scores at the autonomous regulation scales in comparison with those with lower scores at these scales, and more by invoking differences between them in what respects the strength and stability of their mental representations of those schemata, especially if they are schemata for syllogisms that are less frequently encountered in the usual argumentative experiences: more stable representations for the syllogistic schemata would mean that they should be less influenced by the carry-over effects from the exclusively extensional interpretation of the antecedent syllogistic task in its **E** version. Another possible cause for the difference between the **EM** and **ME** conditions might be the assumed opposing influences of the **M** linguistic format when solving valid or invalid syllogisms: on the one hand, the linguistic cues from the **M** format may facilitate the recognition of an appropriate syllogistic schema for a syllogism or they may indicate that a syllogistic schema, whose activation may have been automatically triggered based only on a partial information (not taking into account the entire information provided in premises) because of its usual frequency or its recent use, is an inappropriate one for the current syllogism (i.e., those cues may facilitate the discrimination between syllogisms), but, on the other hand, the same linguistic cues may facilitate the misrecognition of a syllogistic schema (especially when it has a strong and stable mental representation), i.e. its incorrect use for solving a syllogism, most probable for one with similar features to the one for which that schema might have been an appropriate one. In this case, the common features of

the two syllogisms facilitate their confusion, i.e. the inadequate projection of the syllogistic schema of one of them onto the other syllogism, particularly when it does not have a syllogistic schema of its own or its syllogistic schema has a weak mental representation (a situation that it is more probable when the syllogistic schema of a one-model syllogism may be projected onto a multiple-model syllogism).

Because of the above-mentioned opposing influences, when both of them are expected to be in the same type of correlation with the preference for a certain type of emotional regulation goal and when they are closely balanced, the expected correlation between the syllogistic performance and the preference for that type of emotion regulation goal might have disappeared for the **M** version of the syllogistic task. Moreover, the same linguistic cues may favor a residual, remanent, higher activation for the representation of the syllogistic schema of a syllogism that has been recently encountered (higher than the one before its solving), so that, when a similar syllogism is subsequently encountered in the near future, it will be more easily recognized (in case that syllogism has the same logical structure with the initial one) or misrecognized (in case that syllogism is only similar to the initial one, having only some common logical features with it). It is also possible that the linguistic cues from the **M** version of the syllogistic task may favor a general framework of interpretation, of a mixed sematic type, for all the subsequent syllogisms, whereas the **E** version of the syllogistic task, when it is first encountered, may favor an extensional interpretation of the subsequent syllogisms. So, order effects are possible, interacting with the linguistic format effects, leading to differences between the two groups (with a different administration order of the **M** and **E** versions of the syllogistic task) in what respects the pattern of the investigated correlations, and to correlations that contradict the ones predicted by the general hypotheses formulated initially. For example, in the group with the **ME** administration order, the expected positive correlation between the preference for the integrated emotion regulation and the syllogistic performance was not obtained for the **E** version of the syllogistic task. The analysis on types of syllogisms showed that, in this case, not only that the expected positive correlations did not occur, but, for the valid syllogisms, there occurred a tendency toward a negative correlation (see Table 5) between their solving and the preference for the integrated emotion regulation, in opposition with the positive correspondent correlation obtained in the group with the **EM** administration order, for the ipsatized score of the integrated emotion regulation scale. A more detailed analysis indicated that this tendency occurred because some of the valid multiple-model syllogisms that have a particular conclusion (which are, probably, less frequently encountered in the usual argumentative experience), but which have similar logical features with the valid one-model syllogisms that have universal conclusions, whose syllogistic schemata should be more easily recognizable, as they are presumably more frequently encountered in the usual argumentative experience (due to the higher informativeness of their conclusion, as shown in the introductory part). For those multiple-model valid syllogisms, there was a tendency that their correct response to be given in a lesser extent by those with higher scores at the integrated emotion regulation

scale than by those with lower scores of that scale. If the persons who prefer the emotion regulation through integration had had generally an autonomous motivation and if such persons had had presumably a richer argumentative experience, which includes even multiple-mode valid syllogisms with particular conclusions, then the opposite result should have been obtained, a result that would have been also in agreement with the result cited above from Faiciuc (2009, 2017), which indicate a positive correlation between the motivation for autonomy, or autonomous thinking and the syllogistic performance for the valid multiple-model syllogisms. The tendency toward a negative correlation between the preference for the emotion regulation goals through integration and the performance for the above-mentioned multiple-model valid syllogisms only for the **E** version of the syllogistic task in the **ME** administration order group may be, partially, the effect of an order effect, in which the syllogistic schemata of the one-model syllogisms, whose activation was facilitated in the antecedently administered **M** version of syllogistic task, through their supplementary residual activation, were more easily misrecognized as schemas for multiple-model valid syllogisms from the subsequent **E** version of the syllogistic task, particularly in this condition, in which there was no help from the linguistic cues provided in the **M** version of the syllogistic task, which might have impeded this misrecognition. For example, the multiple-model AO2O syllogisms (the 12th syllogism in the syllogistic task from the Appendix 2, a figure 2 syllogism with A and O judgments as premises and the O judgment as conclusion, i.e. a particular judgment) can be confounded with the one-model AE2E syllogism (the tenth syllogism from the Appendix 2, a figure 2 syllogisms, with A and E judgments as premises and the E judgment as conclusion, i.e. a universal conclusion). In the **ME** administration order group, the incorrect E answer was given for the AO2O syllogism more by those with a higher preference (ipsatized scores) for the integrated emotion regulation than by those with a lower preference for it: $U = 38$, $p = .013$, N = 41 (35, 6), whereas in the **EM** administration order, no such significant difference occurred: $U = 58$, $p = .48$, N= 39 (35, 4). The same was true for the AA3I syllogism (the seventh syllogism from the Appendix 2, with two A judgments as premises and the I judgment as a particular conclusion, a figure 3 syllogism), which can be confounded with the AA1A syllogism (the first syllogism from the Appendix 2, with two A judgments as premises and the A judgment as a universal conclusion). In its case, also, the incorrect conclusion A was given more by those with a higher preference (ipsatized scores) for the integrated emotion regulation than by those with a lower preference for it: $U = 79$, $p = .021$, N= 41 (10, 31), whereas in the **EM** administration order, no such significant difference occurred: $U = 148.5$, $p = .54$, N= 39 (13, 26). A tendency for such a difference occurred also for the EI2O (the fifth syllogism from Appendix 2), for which the correspondent similar one-model syllogism would be EA2E (the 13th syllogism from the Appendix 2).

The importance of the validity of the syllogisms in what respects the association between the syllogistic performance and the preference for the investigated types of emotion regulation goals, which was taken into account in the

previous paragraph, will be discussed more thoroughly in what follows, based on the obtained data. They suggest that the relationship between the syllogistic performance and the preference for certain types of emotion regulation goals is much more complex than it may seem at a first glance and that that relationship is due, mainly, to the association between the performance for the valid syllogisms and the preference for the investigated types of emotion regulation goals. For example, the most stable association between the index for the relative autonomy in emotion regulation and the syllogistic performance loses completely its statistical significance in the case of the correctness score for the invalid syllogisms in the **ME** administration order group. These results (see Tables 4-9, 11-16) are, partially, similar to the ones obtained in Faiciuc (2009, 2017), for which the association between the different measures of the personal autonomy correlated positively mainly with the performance for the valid syllogisms, the measure for the motivational orientation toward control correlated negatively mainly with the performance for the invalid syllogisms, but also with the performance for the multiple-model valid syllogisms, whereas the relative autonomy in motivation correlated positively with the performance for the valid syllogisms, especially with the multiple-model ones, and tended to correlate positively also with the performance for the invalid syllogisms. The main differences between the results obtained here in comparison with the ones obtained in Faiciuc (2009, 2017) are that, in the present study, there were obtained also statistically significant positive correlations between the correctness for the invalid syllogisms and the score for the autonomous emotion regulation (but mainly for the non-ipsatized version of that score, in the entire sample, those correlations being, in this case, related probably more with a response tendency for the SWRNE answers, whereas, for its ipsatized version, only one such positive correlation was statistically significant, solely in the **EM** condition, for the **M** version of the syllogistic task, the one that is not that similar with the syllogistic task used in the cited study), and statistically significant negative correlations between the total score for the valid syllogisms and the scores for the controlled emotion regulation. The different instruments used in the present study and its larger sample in comparison with the cited one might be factors to be taken into account in order to explain the above-mentioned differences.

As the general features of the pattern of correlations between the scores of the scales for the different types of emotion regulation goals and the total syllogistic performance were similar with the ones of the patterns of correlations obtained between the scores of the scales for the different types of emotion regulation goals and the scores for the valid and, respectively, invalid syllogisms, the same notes made above can be used here for the interpretation of these results, too. It is to be noted, particularly, the statistically significant positive correlations between the correctness for the invalid syllogisms and the scores for the integrated emotion regulation scale, which indicate that those participants with a higher preference for the integrated emotion regulation may be less prone to confound invalid syllogisms

with the valid ones, maybe because they have more syllogistic schemata for the valid syllogisms and because they are more able to distinguish their features in the encountered syllogisms, especially when they have helping cues, as the linguistic ones from the **M** version of the syllogistic task. An alternative explanation for these positive correlations would be that a putative general, abstract, reasoning ability, maybe linked with general intelligence and working memory, would be involved, which would facilitate the correct solving of the invalid syllogisms and, in the same time, would have a positive association with the preference for the integrated emotion regulation. The hypothetical positive association between a general reasoning ability and the preference for the integrated emotion regulation may be justified through the assumption that the emotion regulation goals through integration would be preferred by those who have the reasoning resources to formulate such goals and to reach them, because "abstract reasoning is essential in understanding the relations among people, objects and most notably, goals", as notes Stevens et al. (2013, p.708). These authors conclude, based on some works cited by them, that the "goal structures and self-regulatory processes" that are proposed in the Self-determination Theory proposed by Deci and Ryan (1995) "are considered cognitive processes because individuals use abstract, personal goal representations to evaluate behavior", and, consequently, "top-down, higher-order cognitive processes–such as abstract thought–may be necessary in order to understand and pursue more complex, abstract goal representations" (Stevens et al., 2013, p. 714). Another possible assumption to justify that association would be that those people who prefer emotion regulation goals through integration might be more able to acquire and develop that putative, general, abstract reasoning ability. These alternative explanations cannot explain all the results obtained in both studies. In the first hand, if only a general abstract reasoning ability (possibly linked with general intelligence and working memory) had related the preference for autonomous emotion regulation goals and syllogistic performance, then statistically significant positive correlations should have occurred, in general, for all types of syllogisms, no matter the linguistic format or the administration order of the two versions of the syllogistic task, which was not the case. Then, in Faiciuc (2009, 2017), the relationship between the autonomous style of thinking and the syllogistic performance was preserved when the general intelligence was controlled. In the third place, there would be no reason linked with the above-mentioned alternative explanations, known to me, for which to occur the pattern of correlations between the concordance scores (see Table 10) or relative concordance scores and the scores for the SWRNE scales that was presented above, in the section for the obtained results. That pattern indicates the respondents' sensitivity to the linguistic cues of the assumed syllogistic schemata, that those cues were capable to help them in solving the syllogisms or, in certain particular conditions, to impede their correct solving, and that this sensitivity may be linked with the preference for certain emotion regulation goals, which differ in their level of autonomy. In accordance with the alternative explanations that involve only a general

abstract reasoning ability, it would have been more plausible that the concordance of an answer with the mixed semantic model (which would require an intensional answer for the figure 1, and figure 3 syllogisms, and an extensional one for the figure 2 syllogisms) to not matter at all or, on the contrary, that there should have been a positive association between the preference for the extensional version of a conclusion for all syllogisms (as the extensional interpretation of the syllogisms may presumably require in a greater extent an abstract general reasoning ability) and the preference for the autonomous emotion regulation, which was not the case.

In the fourth place, the above-mentioned alternative explanations are not able to account for the obtained differences between two patterns of correlations: the pattern of correlations between the scores of the scales for the emotion regulation goals and the scores for the multiple-model valid syllogisms (see Tables 14-16), and the pattern of correlations between the scores of the scales for the emotion regulation goals and the scores for the invalid syllogisms (see Tables 7-9), which are also multi-model syllogisms. This kind of explanations would predict rather the same pattern of correlations for the two types of syllogisms, as the mental model theory of reasoning would predict, too (Johnson-Laird & Bara, 1984). But the results obtained in this study are in contradiction with that prediction of the above-mentioned explanations or of the mental model theory (at least in my view, in its current version). For example, in the case of the entire sample, the scores for the multiple-model valid syllogisms correlated negatively in a statistically significant way with the scores for the external emotion regulation scale in all conditions, and correlated positively in a statistically significant way with the scores for the integrated emotion regulation scale only in a condition (the most favorable one, from a theoretical point of view), whereas the scores for the multiple-model invalid syllogisms did not correlate at all with the scores for the external emotion regulation scale in all conditions, and correlated positively in a statistically significant way with the scores for the integrated emotion regulation scale in all conditions. These results suggest that the valid and invalid multiple-model syllogisms may be solved through different or supplementary reasoning processes than the ones involved solely by the construction of alternative mental models, i.e. trough putative processes linked differentially with the personal autonomy dimension. Such processes would presumably involve the recognition of syllogistic schemata acquired through the frequent encounter with argumentative experiences, as shortcuts in solving syllogisms, developed through the identification of some repetitive patterns of logical semantic features, patterns that are different than the shortcuts of the heuristic strategies (see, for example, in what respects such heuristics, the paper of Chater and Oaksford, from 1999), because they are always logically correct. As stated also in the introductory part, people with a higher personal autonomy or capable to elaborate or choose autonomous goals may have more numerous and variate argumentative experiences, as they do not avoid the situations in which differences of opinions occur. Chances are that, in those

argumentative experiences, more valid syllogisms (the ones in which something is established with certainty, particularly when the conclusion is a universal judgment) to be encountered than invalid syllogisms (syllogisms in which nothing certain can be ascertained). Consequently, such people may have more syllogistic schemata for the multiple-model valid syllogisms than for the invalid ones.

More generally speaking, the usefulness of the helping linguistic cues provided in the **M** version of the syllogistic task for the recognition of the syllogistic schemata may depend on their existence and on their learning level, which confers them (following the Cleeremans' model, from 2006, as stated above) resistance to interferences in their activation (i.e. stableness), an easier actualization, with fewer cues, a longer residual post-stimulus activation (and power for priming, consequently), and even the power to project themselves on new, ambiguous, or incomplete syllogistic structures. That is why, the effect of the **M** and **E** linguistic formats on the relationship between the syllogistic performance and the preference for the considered emotion regulation goals may depend on the type of syllogisms taken into consideration and on the probability that the participants from this sample to have syllogistic schemata with a certain level of strength and stableness for the syllogisms of that type. For those syllogisms that are more frequent and for which even the less autonomous people may have syllogistic schemata (even though weaker, and less stable), supposedly some of the one-model syllogisms (as stated in the introductory part), the linguistic cues of the **M** linguistic format may be not of much help, because those schemata would be recognized even in the **E** linguistic format (this may be one reason for which the pattern of the studied correlations for the case of the one-model syllogisms was somewhat different than the one obtained for the multi-model valid syllogisms). Those cues may be even detrimental for the syllogistic performance, especially for the persons who are more autonomous in the choice of their emotion regulation goals, as mentioned above (when the opposing influences of the **M** linguistic format on the solving of the multiple-model valid or invalid syllogisms were discussed), because they can promote the confusion between these syllogisms and other syllogisms, i.e. the misuse of their schemata especially for those syllogisms with a linguistic format that has few relevant logical semantic features for the recognition of their schemata (the **E** linguistic format, in the case of this study), or for those syllogisms that have fewer chances to have such syllogistic schemata (the invalid syllogisms or some multiple-model valid syllogisms). It seems that such linguistic cues may also promote the recognition that an activated or existing syllogistic schema is not appropriate for an encountered syllogism, but, in the same time, they are not always able to help in finding the correct answer, especially in the absence of a stable syllogistic schema for that syllogism, fostering instead a proneness to choose the answer "no valid conclusion". This possibility is supported by the obtained data that showed a statistically significant positive correlation between the score of the scale for the emotion regulation through integration (in the ipsatized version) and a

score in which the answer "no valid conclusion" was summed up (counted) for the multiple-model syllogisms in the **M** linguistic format, which occurred in the **ME** administration order: ρ = .312, p = .022, N = 42, one-tailed. For the **E** linguistic format, when the helping linguistic cues were absent, no such correlation occurred. In its case, instead, in the **ME** administration order, the score of the scale for the emotion regulation through integration (in its ipsatized version) correlated positively significantly with a score computed through the summation of those incorrect answers for the multiple-model valid syllogisms that coincide with the correct answers for the one-model syllogisms that have similar logical features, with which they might have been confounded: ρ = .305, p = .026, N = 41, one-tailed. In the same time, in the **EM** administration order, this correlation tended to be a negative one: ρ = -.23, p = .08, N = 39, one-tailed. These correlations for the **E** linguistic format may mean that the more argumentative experience one has (presumably indicated by the score of the scale for the emotion regulation through integration), the more she/he would be influenced in her/his solving of the multiple-model valid syllogism from the **E** linguistic format by the residual activation of the syllogistic schemata for the one-model syllogisms recognized in the preceding syllogistic task in the **M** linguistic format, which promotes their confusion with the similar syllogisms from the **E** format, when no helping linguistic cues are offered for their distinction. But when no syllogisms in the **M** linguistic format precede the syllogisms from the **E** format, a higher level of argumentative experience (and, presumably, a higher level of emotion regulation through integration) may even help the choice of an appropriate syllogistic schema for the multiple-model valid syllogisms (correlatively reducing the score for the incorrect answers for the multiple-model valid syllogisms that coincide with the correct answers for the one-model syllogisms), without the interference of some overactivated syllogistic schemata for the one-model syllogisms. These last results show how complicated would be a detailed interpretation of all the obtained data. This is one of the reasons for which such a detailed interpretation was not made here, as the presented correlations in each of the considered conditions may be the result of the interplay of a pretty large number of relevant factors: the level of general intelligence, the level of personal autonomy (motivational, behavioral, etc.), the type of preferred emotion regulation goal measured with SWRNE, the identified response tendency for SWRNE (which seems to have a cognitive significance that is not discussed here), the emotional state before and during the completion of the administered instruments, or the emotional reaction to their administration, the type of syllogisms (one-model syllogisms, valid multiple-model syllogisms, invalid syllogisms, the syllogistic figure of the syllogisms) and the number of syllogisms of each type, the type of the computed scores (ipsatized or non-ipsatized scores for the SWRNE scales, or correctness scores, concordance, or relative concordance scores for the syllogistic task), the linguistic format of the syllogisms (**M** or **E,** i.e. the linguistic cues for the recognition of the syllogistic

schemas correspondent to a mixed semantic interpretation of the syllogisms), the administration order of the two versions of the syllogistic task (**ME** or **EM**), and, finally, of course, the hazard. Such a detailed analysis would be more warranted when the obtained correlations would be replicated on another sample, given the exploratory nature of this part of the study, in which some of the presented statistically significant correlations might have been obtained simply by chance. This is the reason for which only the general pattern of the obtained results was interpreted here, supposing that it is possible to be the more stable one.

For the obtained results in what respects the relationship between the preferred level of autonomy in the choice of the emotion regulation goals and the syllogistic performance, an alternative interpretation than the one presented above (possibly, a complementary one), which had as a starting point one's level of personal autonomy as a given personality trait, would be one in which the causal relationship would be in the opposite direction: a person who happens to have more argumentative experiences (supposedly developing also syllogistic schemas) may develop her/his level of personal autonomy, inclusively in what respects the choice of her/his emotional goals. Afterwards, through a circular causality, a higher level of personal autonomy would subsequently lead to more argumentative experiences. Another starting point for the causal chain could be a problematic emotion regulation (for example, as a consequence of a temperamental trait, of a problematic childhood, or of an insecure attachment style), which, through the negative impact of the resultant intense or inappropriate emotions (see above, in the introductory part of this study), would impede the reasoning processes and their development, which would mean that less cognitive resources will be available for the development of one's personal autonomy, even in what respects the choice of one's emotional goals, and that less argumentative experiences will be encountered. Only the future research would be able to disentangle the complicated circular causal links of the involved factors in the investigated relationship.

No matter the causal direction, the obtained pattern of results indicates that something more than a general intelligence factor may be involved as a mediating factor in the studied relationship (possibly, one's level of argumentative experience), or suggests that the choice of one's emotion regulation goals may have cognitive significance, or that one's level of syllogistic ability (and its development) may have relevance for the choice of one's emotion regulation goals. It is a conclusion that may be not only theoretically important, but also pragmatically relevant, especially in what respects the choice of the psycho-therapeutic objectives linked with the emotion regulation issues and, in the educational psychology, in what regards the setting of the learning goals. The present research replicated also, to an important extent, the results obtained in a study (Faiciuc, 2009, 2017) in which similar or related instruments were used. In its exploratory part, this study contributes to the theoretical understanding of the syllogistic reasoning processes, revealing data that, in my opinion, cannot be fully

accounted by the current version of the mental model theory for the categorical syllogisms, which is still the prevalent theory in this domain of research.

It is to be noted that the obtained pattern of results might be seemingly in contradiction with some of the data obtained in the studies cited in the introductory part of this research. Kim et al. (2002) presented results that indicate that the controlled emotion regulation is associated positively with the negative feelings of anxiety or depression, and that the autonomous emotion regulation (especially the relative autonomy) is positively associated with positive affective states. In the same time, other studies (for example, Cohen & Andrade, 2004) associate the negative affective states with a more analytic style of thinking, and, consequently, if the successful syllogistic reasoning would depend only on this kind of thinking (as the mental model theory would imply), with a better performance in the syllogistic task, especially for the multiple-model syllogisms (which presumably, in accordance with the mental model theory, would require to a greater extent this style of thinking). Correlatively, those studies link the positive affective states with a heuristic, associative, and less deliberate style of thinking, which would be, presumably, more error prone, especially for those syllogisms that are complicated, as it is the case for the multiple-model syllogisms. It can be inferred, by combining the two lines of data, that the controlled emotion regulation should be associated to a higher syllogistic performance, and the autonomous emotion regulation with a lower syllogistic performance, especially for the harder syllogisms. The present study showed instead a reversed pattern of results. The hypothesis of the syllogistic schemas as patterns learned through their repetition in one's argumentative experiences may partially reconcile the results of the current research with the results of the studies cited above, by positing that the style of thinking supposedly promoted by the positive affective states might not be inherently error-prone, especially for the less complicated logical tasks, if the less systematic processes that are involved in this style of thinking are the result of the synthesis and automatization of the more systematic reasoning processes, through an associative pattern recognition and completion. In this case, such a thinking style (possibly associated with more autonomous emotion regulation goals) may be linked positively with the syllogistic performance, as it happened in the current research.

For an improved interpretation of the obtained results, it would have been better if the studied correlations had been controlled for the general intelligence and the level of autonomy in the motivational orientation, as in Faiciuc (2009, 2017). Pragmatic constraints impeded this control (mainly the limited time available in order to administer the assessment instruments and the syllogistic task). Methodologically, it would have been preferable that the administration order of the SWRNE and of the syllogistic task to be counterbalanced, too, in case the administration order of the two versions of the syllogistic task might have had an influence on the answers given for SWRNE. Given that there are no theoretical data, to my knowledge, that would support such an influence, that the available sample of

participants was rather small, and because of the complications that would have occurred in the analysis of the data, I preferred to not use such a design for this research. In the future studies, it would be preferable to use also other measures for the assessment of the emotion regulation goals, which have better psychometric properties and which are not limited to the regulation goals for the negative emotions, and, also, other syllogistic tasks, and participants with different demographic and psychological characteristics. Such forthcoming studies should include, in their investigation, the assessment of the preferred emotion regulation strategies (through which the preferred emotion regulation goals are accomplished), as an additional factor that may play a role in the relationship studied in the current research (the present author has an ongoing investigation in what respects that role). Finally, it would be desirable that the results obtained in this correlational study to be completed with data obtained in studies with an experimental design, in order to clarify the causal links involved in the relation between the syllogistic abilities and the preference for autonomous or externally controlled emotion regulation goals.

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APPENDIX 1

CHESTIONAR PRIVIND TRĂIRILE AFECTIVE

Vă rugăm să citiți enunțurile de mai jos şi să indicați, pentru cele numerotate, cât de mult sunteți de acord sau în dezacord cu fiecare dintre ele, notând cu un *x* căsuța de pe foia de răspuns aflată în dreptul coloanei răspunsului care se potriveşte cel mai mult în cazul Dvs. şi în dreptul numărului enunțului respectiv.

Vă mulțumim!

Când *nu* exprimați în fața altor persoane trăirile voastre afective negative (emoții sau sentimente negative) o puteți face din *diverse motive*. **Motivul pentru care nu îmi exprim în fața altor persoane trăirile mele afective negative este pentru că**:

1. Mă gândesc că alții s-ar putea supăra pe mine dacă exprim aceste trăiri.
2. M-aş simți vinovat(ă) dacă las trăirile mele negative să iasă la iveală.
3. Simt o satisfacție personală atunci când pot să îmi trăiesc emoțiile fără să las ca ele să fie supărătoare.
4. Exprimarea emoțiilor negative doar i-ar răni pe alții şi o persoană nu ar trebui să facă acest lucru.
5. Există unele situații în care este util să îmi exprim trăirile şi altele în care nu este util să fac acest lucru.
6. Aş simți că sunt ca o persoană rea dacă aş exprima în fața prietenilor mei trăirile mele negative.
7. Părinții şi prietenii mei se aşteaptă să mă controlez.
8. Îmi face plăcere să fiu conştient(ă) de trăirile mele, dar îmi aduce satisfacție şi păstrarea unei aparențe pozitive în exterior.
9. Este important pentru mine personal să **nu** îi rănesc pe alții.
10. **Nu** cred că am dreptul să deranjez alți oameni cu trăirile mele negative.
11. Ca o persoană grijulie, **nu** vreau să-i supăr pe alții cu trăirile mele negative.
12. Îmi e teamă că oamenii **nu** mă vor plăcea dacă îmi exprim trăirile.
13. Este important să fiu conştient(ă) de trăirile mele negative, dar dacă le păstrez pentru mine însumi(însămi) este pentru a-mi menține stabilitatea emoțională.

Există *diverse motive* **pentru care uneori vă puteți purta ca şi cum totul ar fi în regulă, chiar dacă sunteți supărat**. **Uneori, când sunt supărat, mă port ca şi cum totul este în regulă, pentru că:**

14. Mi-ar fi ruşine de mine însumi(însămi) dacă aş lăsa ca trăirile mele negative să iasă la iveală.
15. Ce este important este să înțeleg propria mea supărare, dar s-ar putea să nu fie util să le spun altora despre ea.
16. Mă gândesc că mi-ar putea distruge relațiile mele cu alte persoane dacă vorbesc mereu despre ce mă deranjează.
17. Este important pentru mine să nu îi împovărez pe alții cu problemele mele.
18. Îmi aduce satisfacție să fiu capabil(ă) să fac astfel încât supărarea mea să **nu** interfereze cu scopurile mele, împiedicând realizarea lor.
19. Vreau ca alții să creadă că sunt matur(ă).
20. Este o provocare interesantă să rămân calm(ă) şi să **nu** ajung să fiu supărat(ă) mereu.
21. M-aş simți ruşinat(ă) dacă i-aş lăsa pe alții să vadă ce mă deranjează.
22. Simt că este un semn de maturitate să păstrez o atitudine pozitivă.
23. Îmi aduce satisfacție să fiu capabil(ă) să-mi realizez scopurile chiar şi atunci când sunt supărat(ă).
24. Cred că oamenii ar trebui să-şi păstreze supărarea numai pentru ei înşişi.
25. Mi-e teamă că oamenii nu mă vor plăcea, dacă voi lăsă să se vadă ce mă deranjează.
26. Păstrez trăirile mele negative numai pentru mine astfel încât să pot realiza proiecte importante.
27. Cred că ar trebui să urmez normele sociale.
28. Vreau ca alții să creadă că sunt o persoană bună.

APPENDIX 2

SYLLOGISTIC TASK USED IN FAICIUC (2009, 2017)

Response options:
A. All **S** are **P**.
B. All **S** are **not P**.
C. Some **S** are **P**.
D. Some **S** are **not P**.
E. It is **not** possible to derive a necessary logical conclusion.

1. All **M** are **P**.
   All **S** are **M**.
2. All **M** are **P**.
   All **S** are **not M**.
3. All **M** are **P**.
   Some **S** are **M**.
4. All **M** are **P**.
   Some **S** are **not M**.
5. All **M** are **not P**.
   All **S** are **M**.
6. All **M** are **not P**.
   All **S** are **not M**.
7. All **M** are **not P**.
   Some **S** are **M**.
8. All **M** are **not P**.
   Some **S** are **not M**.
9. All **P** are **M**.
   All **S** are **M**.
10. All **P** are **M**.
    All **S** are **not M**.
11. All **P** are **M**.
    Some **S** are **M**.
12. All **P** are **M**.
    Some **S** are **not M**.
13. All **P** are **not M**.
    All **S** are **M**.
14. All **P** are **not M**.
    All **S** are **not M**.
15. All **P** are **not M**.
    Some **S** are **M**.
16. All **P** are **not M**.
    Some **S** are **not M**.
17. All **M** are **P**.
    All **M** are **S**.
18. All **M** are **P**.
    All **M** are **not S**.
19. All **M** are **P**.
    Some **M** are **S**.
20. All **M** are **P**.
    Some **M** are **not S**.
21. All **M** are **not P**.
    All **M** are **S**.
22. All **M** are **not P**.
    All **M** are **not S**.
23. All **M** are **not P**.
    Some **M** are **S**.
24. All **M** are **not P**.
    Some **M** are **not S**

The **E** format task

In what follows, there are presented **24 problems of logical reasoning**, named **syllogistic reasoning.**

You are required to find the solution for each of them, by inferring the **logically necessary conclusion** that derives from the *information* presented in the *two premises* (judgments) of a problem *if it is assumed that that informationIs true*.

In order to give the answer, you have to choose one of the statements given below and to write on the reserved space, placed near the word "Conclusion", the letter (**A**, **B**, **C**, **D**, **E**) that corresponds to the chosen statement:

Response options:
A. All members of the class **S** are also members of the class **P**.
B. All members of the class **S** are **not** also members of the class **P**.
C. Some members of the class **S** are also members of the class **P**.
D. Some members of the class **S** are **not** also members of the class **P**.
E. It is **not** possible to derive a necessary logical conclusion.

1. All members of the class **M** are also members of the class **P**.
   All members of the class **S** are also members of the class **M**.
2. All members of the class **M** are also members of the class **P**.
   All members of the class **S** are **not** also members of the class **M**.
3. All members of the class **M** are also members of the class **P**.
   Some members of the class **S** are also members of the class **M**.
4. All members of the class **M** are also members of the class **P**.
   Some members of the class **S** are **not** also members of the class **M**.
5. All members of the class **M** are **not** also members of the class **P**.
   All members of the class **S** are also members of the class **M**.
6. All members of the class **M** are **not** also members of the class **P**.
   All members of the class **S** are **not** also members of the class **M**.
7. All members of the class **M** are **not** also members of the class **P**.
   Some members of the class **S** are also members of the class **M**.
8. All members of the class **M** are **not** also members of the class **P**.
   Some members of the class **S** are **not** also members of the class **M**.
9. All members of the class **P** are also members of the class **M**.
   All members of the class **S** are also members of the class **M**.
10. All members of the class **P** are also members of the class **M**.
    All members of the class **S** are **not** also members of the class **M**.
11. All members of the class **P** are also members of the class **M**.
    Some members of the class **S** are also members of the class **M.**
12. All members of the class **P** are also members of the class **M**.
    Some members of the class **S** are **not** also members of the class **M**.
13. All members of the class **P** are **not** also members of the class **M**.
    All members of the class **S** are also members of the class **M**.
14. All members of the class **P** are **not** also members of the class **M**.
    All members of the class **S** are **not** also members of the class **M**.
15. All members of the class **P** are **not** also members of the class **M**.
    Some members of the class **S** are also members of the class **M**.
16. All members of the class **P** are **not** also members of the class **M**.
    Some members of the class **S** are **not** also members of the class **M**.
17. All members of the class **M** are also members of the class **P**.

All members of the class **M** are also members of the class **S**.

18. All members of the class **M** are also members of the class **P**.
    All members of the class **M** are **not** also members of the class **S**.
19. All members of the class **M** are also members of the class **P**.
    Some members of the class **M** are also members of the class **S**.
20. All members of the class **M** are also members of the class **P**.
    Some members of the class **M** are **not** also members of the class **S**.
21. All members of the class **M** are **not** also members of the class **P**.
    All members of the class **M** are also members of the class **S**.
22. All members of the class **M** are **not** also members of the class **P**.
    All members of the class **M** are **not** also members of the class **S**.
23. All members of the class **M** are **not** also members of the class **P**.
    Some members of the class **M** are also members of the class **S**.
24. All members of the class **M** are **not** also members of the class **P**.
    Some members of the class **M** are **not** also members of the class **S**.

The **M** format task

In what follows, there are presented **24 problems of logical reasoning**, named **syllogistic reasoning.**

You are required to find the solution for each of them, by inferring the **logically necessary conclusion** that derives from the *information* presented in the *two premises* (judgments) of a problem *if it is assumed that that informationIs true*.

In order to give the answer, you have to choose one of the statements given below and to write on the reserved space, placed near the word "Conclusion", the letter (**A**, **B**, **C**, **D**, **E**) that corresponds to the chosen statement:

Response options:
A. All members of the class **S** have the property **P**.
B. All members of the class **S** are also members of the class **P**.
C. All members of the class **S** do **not** have the property **P**.
D. All members of the class **S** are **not** also members of the class **P**.
E. Some members of the class **S** have the property **P**.
F. Some members of the class **S** are also members of the class **P**.
G. Some members of the class **S** do **not** have the property **P**.
H. Some members of the class **S** are **not** also members of the class **P**.
I. It is **not** possible to derive a necessary logical conclusion.

1. All members of the class **M** have the property **P**.
   All members of the class **S** are also members of the class **M**.
2. All members of the class **M** have the property **P**.
   All members of the class **S** are **not** also members of the class **M**.
3. All members of the class **M** have the property **P**.

Some members of the class **S** are also members of the class **M**.

4. All members of the class **M** have the property **P**.
   Some members of the class **S** are **not** also members of the class **M**.
5. All members of the class **M** do **not** have the property **P**.
   All members of the class **S** are also members of the class **M**.
6. All members of the class **M** do **not** have the property **P**.
   All members of the class **S** are **not** also members of the class **M**.
7. All members of the class **M** do **not** have the property **P**.
   Some members of the class **S** are also members of the class **M**.
8. All members of the class **M** do **not** have the property **P**.
   Some members of the class **S** are **not** also members of the class **M**.
9. All members of the class **P** have the property **M**.
   All members of the class **S** have the property **M**.
10. All members of the class **P** have the property **M**.
    All members of the class **S** do **not** have the property **M**.
11. All members of the class **P** have the property **M**.
    Some members of the class **S** have the property **M.**
12. All members of the class **P** have the property **M**.
    Some members of the class **S** do **not** have the property **M**.
13. All members of the class **P** do **not** have the property **M**.
    All members of the class **S** have the property **M**.
14. All members of the class **P** do **not** have the property **M**.
    All members of the class **S** do **not** have the property **M**.
15. All members of the class **P** do **not** have the property **M**.
    Some members of the class **S** have the property **M**.
16. All members of the class **P** do **not** have the property **M**.
    Some members of the class **S** do **not** have the property **M**.
17. All members of the class **M** have the property **P**.
    All members of the class **M** are also members of the class **S**.
18. All members of the class **M** have the property **P**.
    All members of the class **M** are **not** also members of the class **S**.
19. All members of the class **M** have the property **P**.
    Some members of the class **M** are also members of the class **S**.
20. All members of the class **M** have the property **P**.
    Some members of the class **M** are **not** also members of the class **S**.
21. All members of the class **M** do **not** have the property **P**.
    All members of the class **M** are also members of the class **S**.
22. All members of the class **M** do **not** have the property **P**.
    All members of the class **M** are **not** also members of the class **S**.
23. All members of the class **M** do **not** have the property **P**.
    Some members of the class **M** are also members of the class **S**.
24. All members of the class **M** do **not** have the property **P**.
    Some members of the class **M** are **not** also members of the class **S**.