

## Mindsets in Action and Interaction among Music Students

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### **Abstract**

*The main goal of this research was to compare the interaction style of the persons with fixed and growth mindsets, while also taking into account two priming conditions that implied either the activation of a deliberative cognitive processing, or the activation of an implemental one.*

*The participants were 60 music students who were randomly distributed into 4-member teams (one member for each of the four possible combinations between fixed/growth mindsets and deliberative/implemental ones).*

*The two categories of mindsets were controlled using a questionnaire that comprised 30 items regarding beliefs and attitudes defining for fixed/growth mindsets, as well as two tasks design to favor the use of the implemental and deliberative mindsets.*

*The obtained results were consistent with the theoretical framework that defines each of the four types of mindsets, revealing that the participants with fixed mindsets were more inclined to propose less possible solutions, interact lesser with the research assistant and team colleagues, as well as to give up easier to their own ideas, compared to those with growth mindsets. Moreover they were perceived less favorable than their counterparts. On the other hand, the participants primed for deliberative mindsets seemed to interact more often and for longer periods of time with the research assistant, as well as to express more solutions to the task.*

**Keywords:** *fixed mindsets, growth mindsets, deliberative mindsets, implemental mindsets, mindset theory of action phase, interaction style*

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## I. INTRODUCTION

### 1. Fixed and growth mindsets

According to Dweck & Legget (1988), people's beliefs regarding the malleability of personal attributes provide a framework for understanding their goal orientations which may further explain their susceptibility towards patterns of either adaptive or maladaptive behaviors, thoughts and affect. In other words, focusing on such beliefs could be essential in improving one's capacity to self-develop and learn, maintain satisfying relationships, cope with life events or achieve satisfying academic and career results (Dweck, 2008).

The beliefs about personal ability are found in the specialized literature under the name of self-theories or mindsets and, irrespective of their nature, they have been proved to play an essential role in people's functioning. Thus, research have shown that there are two types of theories: the entity theory according to which intelligence or other important traits are genetically determined, being impossible for someone to modify their quantity or quality, and the incremental theory according to which one's abilities could be developed through persistent effort and training (Dweck, 1999). The equivalent of entity theory is the concept of "fixed mindset", while the equivalent of incremental theory is the concept of "growth mindset".

Those who embrace the first type of thinking tend to follow performance goals, meaning that they are predominantly concerned to validate their intelligence by applying normative standards, with the cost of them giving up, withdrawing effort, or avoiding activities that carry the risk of a "negative verdict", even though those activities may be beneficial for personal growth. In contrast, those who hold an incremental theory are prone to focus more on learning goals, namely to gain knowledge and increase personal competence, by defining their performance through self-referential standards (Dweck & Grant, 2008).

Thus, it is not surprising that research has shown that, on one hand, people with growth mindsets are more open to learning opportunities, more able to persist in their efforts when confronted with obstacles, more inclined to view difficulties as constructive challenges, as well as more prone to value effort, while on the other hand, people with fixed mindsets tend to become easily discouraged or defensive if they don't succeed immediately, to see effort as a clue for lack of ability and to promote a more inflated positive image of themselves by lying or cheating (Dweck, 2010). Moreover, people who adopt an incremental theory of intelligence, being also motivated by learning goals, usually obtain a higher level of achievement than those with fixed mindsets (e.g., Blackwell et al., 2007).

## **2. Deliberative and implemental mindsets**

The concept of “mindset” has actually emerged initially in the field of cognitive psychology, being introduced at the beginning of the 20<sup>th</sup> century by the German psychologists Külpe, Marbe, Orth and Watt who defined it as the sum of cognitive procedures activated as a result of a deep involvement in a certain task, in order to enhance performance (Gollwitzer, 2012).

Based on this definition, Gollwitzer (1990) elaborated the mindset theory of phase action by superimposing the idea of cognitive processing consistent with a specific activity, on the stages of goal pursuit (pre-decisional, post-decisional and post-actional phases). According to this theory, each goal action phase implies a different task that leads to a set of correspondent cognitive procedures. Thus, the deliberative mindsets accompany the pre-decisional demands of selecting the most appropriate goal by analyzing both personal wishes and circumstantial factors. On the other hand, the implemental mindsets characterize and facilitate the accomplishment of the task central for the pre-actional stage, namely planning and executing the actions necessary in order to achieve the chosen goal (Gollwitzer, 1990).

As numerous studies have shown, the two types of mindsets have proved to differ significantly one from another, with respect to their cognitive features. Thus, the deliberative mindsets were associated with a more accentuated tendency to process open-mindedly the available information, to not initiate the action immediately, as well as to focus and analyze accurately and impartially the feasibility and desirability of the goal-related information. In contrast, the implemental mindsets favor a different cognitive approach by predisposing the person to process the available information more close-mindedly, to be tuned toward implementation-related information, to take immediate action, as well as to analyze in an overly positive manner and with a great deal of partiality the feasibility and desirability of the goal-related information, in a way that enhances people’s positive illusions (Gollwitzer & Bayer, 1999).

## **3. The present study – objectives & hypotheses**

The main objective of this research was to study the degree to which different mindsets could be involved in applying different interaction styles in order to accomplish a teamwork activity. We were interested in comparing a series of communication indicators associated with the two types of mindsets within Dweck’s and Gollwitzer’s classifications, as well as with the four categories resulted from combining fixed/growth mindsets with the deliberative/implemental ones. The communication indicators that we measured were the

number of solutions proposed for the problem implied by the task, the questions and comments addressed to the experimenter and team colleagues, the length of time each person talked and the ratings received from his/hers colleagues regarding the quality of interaction with each one of them.

Based on the tendencies implied by the activation of each mindset, as they have been described in the specialized literature, we expected to find that:

- The participants with fixed mindsets would be more reluctant to express possible solutions, interact with the research assistant, engage in dialog with team colleagues, seek different approaches to the problem, as well as to manifest consistency in sustaining own ideas, compared to those with growth mindsets, irrespective of the experimental condition (deliberative vs implemental mindsets) they were exposed to. Moreover, we thought that there were great chances for them to be evaluated less favorable by their team colleagues, than their counterparts.

- The participants primed for deliberative mindsets would address more questions to the research assistant, engage in longer interactions with him and seek more answers to different aspects related to the problem, than the participants primed for implemental mindsets. On the other hand, we expected to find no significant differences regarding the communication indicators relevant for the within group interaction. Moreover, considering that both mindsets are useful in goal pursuit we considered that the ratings received from the other team members, would be similar, between the two groups.

- The comparisons between the subgroups obtained by combing the two categories of mindsets would be consistent with the results mentioned above. More precisely, the participants from the implemental and deliberative mindsets condition would be different depending on their fixed vs growth mindsets, with regard to all variables, as it would be noticed if the implemental/deliberative variable was not taken into account. On the other hand, when considering the characteristics of fixed/growth mindsets, the differences between the implemental and deliberative mindsets groups would be similar with the ones obtained if this variable was ignored.

## II. METHOD

### 1. Participants

The initial sample used in this study comprised 80 Romanian participants (37 men and 43 women,  $M_{age} = 25.23$ ;  $SD = 3.30$ ) randomly chosen from the second year students of the National Music University of Bucharest, Faculty of Musical Interpretation.

The participants were asked the permission to be included in a psychological study, and they were explained that the engagement in this experiment would not affect in any way their

grades or their physical or psychological integrity. Also, they were informed that a certain phase of the study implied them being video recorded, and were asked if they agreed with that, knowing that the videos would be used only by the experimenter, exclusively for this research, and not in other purposes.

After giving their informed consent for participation, the 80 students were asked to complete a questionnaire regarding their goal orientation and theory of intelligence that aimed to differentiate the ones with fixed mindsets, from the ones with growth mindsets. Then, depending on their responses, we formed 2 samples, by randomly extracting 30 participants with fixed mindsets ( $M_{age} = 24.86$ ,  $SD = 2.95$ ) and 30 participants with growth mindsets ( $M_{age} = 26.16$ ,  $SD = 3.34$ ).

From each of these samples, we further constituted two more subgroups according to the two types of mindsets described in Gollwitzer's theory, by using a priming task in order to activate either the deliberative mindsets, or the implemental ones. Thus, we finally had 4 research samples, as follows:

- 15 students with fixed and implemental mindsets ( $M_{age} = 25.53$ ,  $SD = 3.07$ );
- 15 students with fixed and deliberative mindsets ( $M_{age} = 24.20$ ,  $SD = 2.66$ );
- 15 students with growth and implemental mindsets ( $M_{age} = 25.33$ ,  $SD = 3.71$ );
- 15 students with growth and deliberative mindsets ( $M_{age} = 27.00$ ,  $SD = 2.68$ );

In order to evaluate the interaction styles supposedly connected with the activated mindsets, we created 15 teams comprised of 4 students randomly selected from the four subgroups (one student from each sample) and we introduced them in a situation that implied a teamwork task.

## **2. Procedure**

The first two phases of the study had the goal of manipulating the fixed and growth mindsets, as well as the deliberative and implemental ones, in a way consistent with the two-factor design of this research. Thus, firstly we identified the participants' fixed and growth mindsets based on their answers to a questionnaire, and secondly we applied a priming procedure similar with the one used by Gollwitzer et al. (1990) in order to facilitate the activation of deliberative and implemental mindsets (depending on a specific task that they have received). The third phase had a preceding step of building teams of four students, and consisted in measuring the dependent variables in a setting designed to stimulate the communication between members.

In order to prime the participants for deliberative and implemental mindsets we asked them either to reflect on a conflicting decisional problem (deliberative mindsets), or to elaborate

a plan for a project (implemental mindsets) and, in both scenarios, to write down their thoughts, knowing that the notes will be evaluated by the team of researchers. Based on the work of other authors (e.g., Smith and Branscomb, as cited in Gollwitzer et al., 1990) we assumed that the cognitive patterns that were turned on in a context would remain active in a subsequent situation, at least for a period of time, as a result of a transference effect.

More specific, after the first phase, the 60 participants were randomly divided into 15 groups, each comprised of 4 persons (two with fixed mindsets and two with growth mindsets). Each group followed a research assistant (we had a team of 15 psychology students who voluntarily helped us with the research) to a quiet place and received a note with the instructions for one of the two priming tasks. The participants had 15 minutes to complete the task.

The next phase, gathering the data correspondent to the dependent variables, followed smoothly, with no break, the previous step. The participants remained in the same formula of 4 team members and were coordinated by the same research assistant. Then they were instructed to collaborate one to another in order to come up with as many plausible solutions to an ambiguous situation, as possible, as well as to guess the so called “correct” answer (a pre-established answer). Each different solution valued one point, while hitting the correct answer was equal to 3 points. In order to enhance their motivation they were informed that the team with the highest number of points will win a prize consisted of 4 movie tickets (one for each team member).

The research assistant read the problem loudly and then passed the note to participants. All teams received the same problem. They were explained that, besides communicating with their team colleagues, they had the permission to address the research assistant as many closed questions regarding the ambiguous situation per se, as they wanted, knowing that they’ll receive only “Yes”, “No” or “Reformulate” answers, and not explicit clues or confirmations regarding the correct answer. The time required for completing the task was 20 minutes.

The dependent variables that we observed and quantified for each participant, in order to evaluate his/hers interaction style were:

- the number of proposed solutions;
- the total number of questions addressed to the research assistant;
- the number of questions regarding different aspects, addressed to the research assistant;
- the divergence in seeking answers, calculated as the number of questions regarding different aspects that were addressed to the research assistant, divided by the total number of questions addressed to the research assistant;
- the length (in seconds) of interactions initiated towards the research assistant;
- the total number of comments, proposals or suggestions expressed towards team colleagues, excepting the actual solutions to the problem;
- the number of interventions on different aspects, during team interaction;

- the consistency in expressing own ideas, calculated as the number of interventions on different aspects during team interaction, divided by the total number of comments, proposals or suggestions expressed towards team colleagues;
- the length (in seconds) of all interventions towards team colleagues (including the moments when they presented their solutions to the problem);
- the impression that the other three team members had on the quality of the interaction with their colleague, measured immediately after the task had been completed, by asking the participants to rate on a 10-point Likert scale written on a piece of paper, how positive their perception was.

All participants were filmed starting from the moment when the research assistant read the ambiguous situation, until the moment when they were asked to evaluate the quality of interaction with the other three members of the team. Therefore, by analyzing the recordings, we were able to gather the data with great precision, following the indicators mentioned above.

### **3. Materials**

#### **3.1. A questionnaire for fixed and growth mindsets**

Participants' fixed and growth mindsets were evaluated using a questionnaire designed by us starting from the theory of intelligence, goal achievement theory and Dweck's definition of mindsets. The questionnaire incorporated 30 items with multiple choice answers – the participants had to choose on a five-point Likert scale the degree to which they considered that each statement was representative for their attitudes and thinking. Generally, the items were referred to one's beliefs regarding the changeable/ unchangeable character of intelligence, the utility of effort versus the futility of effort considering their abilities, the need to gain favorable judgments of their competence, the desire to simply increase their abilities and not to seek others approval, the way they validate own ability (using normative versus self-referential standards) etc. Cronbach's  $\alpha$  for scale's internal consistency was .79.

#### **3.2. The problem for the teamwork task**

For the purpose of having a common goal that would stimulate group communication that would offer us the possibility to evaluate different styles of interaction, we asked the participants to find as many plausible explanations as possible for the following situation: "In a desert a man was found dead with a stick in his hand. What happened?"

The answer that the participants had to guess in order to gain 3 points, besides the one obtained for each original and plausible scenario, was the following: "Two friends were flying in a hot air balloon. Suddenly, because of the currents, the balloon headed abruptly to the ground,

risking to crash and to kill the passengers. They threw all the ballast but they still had to throw something else. The two realized that one of them had to sacrifice himself, but who? They cast lots: the one who drew the shortest stick had to jump out. This was the only way in which at least one of them could survive.”

### III. RESULTS

In order to measure the differences regarding the participants’ communication style we conducted a statistical analysis consisted of applying a succession of Kruskal-Wallis tests - one test for each dependent variable - considering the four levels of independent variable resulted from combining the two categories of mindsets. Each Kruskal-Wallis test was followed by post hoc between-group comparisons obtained by repeatedly applying the Mann-Whitney test. The decision of using non-parametric tests was due to the small number of participants included in each of the four samples ( $N = 15$ ). We also applied Mann-Whitney tests in order to compare the fixed mindsets group ( $N = 30$ ) with the growth mindsets one ( $N = 30$ ) (independently of the second category of mindsets) and vice versa – the deliberative mindsets group ( $N = 30$ ) with the implemental mindsets one ( $N = 30$ ), independently of the fixed/growth mindsets groups – considering the fact that none of the distributions were normal.

Table 1. Mann-Whitney tests for the differences between fixed and growth mindsets groups, as well as between implemental and deliberative mindsets groups.

Communication Indicators	Fixed vs. Growth				Implemental vs. Deliberative			
	<i>U</i>	<i>z</i>	<i>p</i>	<i>r</i>	<i>U</i>	<i>z</i>	<i>p</i>	<i>r</i>
Proposed solutions	160.00	-4.49	.000	-.57	298.00	-2.35	.018	-.30
Questions addressed to the research assistant	126.00	-3.37	.000	-.43	210.00	-3.64	.000	-.46
Divergence in seeking answers	239.00	-3.53	.000	-.45	234.00	-3.61	.000	-.46
Interaction with the research assistant (seconds)	131.50	-4.78	.000	-.61	188.00	-3.93	.000	-.50
Comments within group activity	52.50	-5.91	.000	-.76	352.50	-1.45	.147	-.18
Consistency in expressing own ideas	9.00	-6.49	.000	-.83	415.00	-.29	.566	-.03
Interaction with team colleagues (seconds)	213.00	-3.50	.000	-.45	396.50	-.79	.429	-.10
Popularity among team colleagues	68.50	-5.84	.000	-.75	377.00	-1.11	.264	-.14

Note.  $N = 30$  for each group

The statistical results revealed that the participants who scored high on fixed mindsets scale proposed fewer solutions to the problem and interacted lesser with the research assistant in

terms of both time and number of questions, compared to those characterized by growth mindsets. Moreover, they also showed a tendency to seek fewer different approaches to the problem than their counterparts. The differences regarding the other communication indicators also proved to be statistically significant. Thus, the students with growth mindsets engaged in communication with their team colleagues more times and for longer periods of time, and showed greater consistency in sustaining their ideas, compared to those from the fixed mindsets group. Besides, their communication style was perceived better by the other team members, as it could be noticed based on the significantly lower ratings received by those with fixed mindsets. The effect sizes were medium and large.

On the other hand, as far as the comparison between the participants primed for implemental mindsets and those primed for deliberative mindsets was concerned, there were not identified statistically significant differences regarding the number of comments and proposals towards team colleagues, consistency in expressing own ideas, length of interaction with the other team members (in seconds), or the quality of interaction perceived by the team colleagues. Instead, the two groups differed significantly with regard to all indicators measured in the context of communicating with the research assistant. Thus, the participants from the deliberative mindsets condition overall tended to express more solutions, address more questions to the research assistant, have a higher degree of divergence in seeking answers and receive more favorable ratings from team colleagues. The effect sizes for these significant results were medium to high.

Table 2. Kruskal-Wallis tests for each communication indicator, depending on the combination of mindsets (fixed & implemental; fixed & deliberative; growth & implemental; growth & deliberative)

Communication Indicators	<i>H</i>	<i>p</i>	Medians			
			FI Group	FD Group	GI Group	GD Group
Proposed solutions	25.82	.000	0	1.00	1.00	2.00
Questions addressed to the research assistant	39.04	.000	0	1.00	1.00	4.00
Divergence in seeking answers	26.78	.000	0	0	0	.50
Interaction with the research assistant (seconds)	40.16	.000	0	25.00	43.00	214.00
Comments within group activity	37.21	.000	3.00	5.00	7.00	8.00
Consistency in expressing own ideas	42.44	.000	.77	.80	.40	.40
Interaction with team colleagues (seconds)	13.39	.004	127.00	178.00	371.00	388.00
Popularity among team colleagues	35.45	.000	25.00	27.00	30.00	30.00

Note. *df* = 3 for all analyses; *N* = 15 for each group

According to our expectations, Kruskal-Wallis test applied for each dependent variable reflected that the four combinations of mindsets had a significant impact on the way participants communicated with the research assistant and team colleagues, as defined by the eight measured indicators.

The exact differences between the four research groups formed depending on the combination of the two categories of mindsets, were obtain with multiple Mann-Whitney tests as presented in Table 3-4. A Bonferroni correction was applied in order to reduce the error resulted from repeatedly conducting this statistical procedure. Therefore all results below should be analyzed having as benchmark a critical value of  $p < .0125$ .

Table 3. Mann-Whitney tests for the differences between fixed & implemental group vs. growth & implemental one, as well as between fixed & deliberative group vs. growth & deliberative one

Communication Indicators	Fixed & Implemental vs. Growth & Implemental				Fixed & Deliberative vs. Growth & Deliberative			
	<i>U</i>	<i>z</i>	<i>p</i>	<i>r</i>	<i>U</i>	<i>z</i>	<i>p</i>	<i>r</i>
Proposed solutions	40.50	-3.22	.001	-.58	31.50	-3.50	.000	-.63
Questions addressed to the research assistant	38.50	-3.29	.001	-.60	4.00	-4.54	.000	-.82
Divergence in seeking answers	75.00	-2.39	.042	-.43	51.50	-2.60	.008	-.47
Interaction with the research assistant (seconds)	39.00	-3.21	.001	-.58	1.00	-4.63	.000	-.84
Comments within group activity	6.50	-4.43	.000	-.80	14.00	-4.12	.000	-.75
Consistency in expressing own ideas	1.00	-4.57	.000	-.83	.00	-4.69	.000	-.85
Interaction with team colleagues (seconds)	48.00	-2.67	.007	-.48	57.00	-2.30	.020	-.41
Popularity among team colleagues	14.50	-4.16	.000	-.75	17.50	-4.13	.000	-.75

Note.  $N = 15$  for all groups; All  $p$  values are exact significance values (two-tailed).

The values resulted from Mann-Whitney tests sustained our hypotheses, suggesting that adopting beliefs and attitudes consistent with fixed mindsets as opposed to growth mindsets, could imply significant differences at the level of interpersonal communication.

Thus, it could be noticed that the participants with fixed mindsets, no matter if they had been primed for implemental or deliberative mindsets, tended to initiate fewer interactions with the research assistant and team colleagues, as well as to express fewer ideas as possible solutions to the problem. Moreover, they were rated less favorable by the other team colleagues with regard to their style of communication. The effect sizes were generally large.

The only results contrary to our expectations were the not statistically significant differences between fixed mindsets group and growth mindsets one, with respect to divergence

in seeking answers ( $p = .04$ ) and length of the interaction with team colleagues ( $p = .02$ ). However, it is important to highlight once again that these results were obtained in the context of applying the Bonferroni correction.

Table 4. Mann-Whitney tests for the differences between fixed & implemental group vs. fixed & deliberative one, as well as between growth & implemental group vs. growth & deliberative one

Communication Indicators	Fixed & Implemental vs. Fixed & Deliberative				Growth & Implemental vs. Growth & Deliberative			
	<i>U</i>	<i>z</i>	<i>p</i>	<i>r</i>	<i>U</i>	<i>z</i>	<i>p</i>	<i>r</i>
Proposed solutions	65.50	-2.22	.049	-.40	64.50	-2.05	.042	-.37
Questions addressed to the research assistant	59.50	-2.44	.020	-.44	9.50	-4.32	.000	-.78
Divergence in seeking answers	82.50	-2.10	.100	-.38	39.00	-3.13	.001	-.57
Interaction with the research assistant (seconds)	52.50	-2.70	.006	-.49	2.00	-4.58	.000	-.83
Comments within group activity	71.50	-1.73	.087	-.31	84.00	-1.20	.236	-.21
Consistency in expressing own ideas	85.00	-.90	.376	-.16	111.50	-.04	.975	-.00
Interaction with team colleagues (seconds)	74.50	-1.57	.118	-.28	64.50	-2.05	.042	-.37
Popularity among team colleagues	74.00	-1.61	.109	-.29	91.50	-1.08	.400	-.78

Note.  $N = 15$  for all groups; All  $p$  values are exact significance values (two-tailed).

The results emphasized in the case of communication indicators associated with the activation of Gollwitzer’s mindsets while also considering the distinction between the two types of mindsets conceptualized by Dweck, revealed furthermore the possibility that the deliberative and implemental mindsets could be involved to a degree or another in the way participants have interacted with the research assistant especially for the growth mindsets group, but without losing in popularity ratings.

Thus, the statistical analysis for the participants with fixed mindsets showed a significant difference only with regard to the length of the interaction with the research assistant, the participants with deliberative mindsets being tended to talk longer (in seconds) than the ones with implemental mindsets.

On the other hand, as far as the students from the growth mindsets group were concerned, the differences were statistically significant at the level of three variables defining for the communication style with the research assistant: number of addressed questions, divergence in seeking answers and the length of interaction time. The effect sizes were large.

#### IV. CONCLUSIONS

The considerable amount of research within the field of motivation psychology has repeatedly stated the importance of mindsets in shaping one's thoughts, emotions and behaviors related to goal achievement, and implicitly in enhancing performance in all domains of human functioning.

Thus, based especially on the work of psychologists Carol Dweck and Paul Gollwitzer, the present study was designed to explore the role of mindsets in the way team members interact in order to accomplish a common goal. The applied methodology incorporates a series of shortcomings such as reduced sample sizes or an insufficient control of some possible confounding variables, but the obtained results may still represent a basis for future research especially because they seem to be consistent with the theoretical framework that defines each of the four types of mindsets that were investigated.

The participants with fixed mindsets initiated fewer interactions with the research assistant and team colleagues, were less productive in expressing solutions to the problem, and presented a style of communication that was perceived less favorable, compared to those with growth mindsets. These outcomes could be an expression of the tendencies usually associated with being oriented towards performance goals, such as taking safety measures in order to avoid the possibility of invalidating own qualities.

Moreover, it was noticed that the participants who were primed for deliberative mindsets seemed to interact more often and for longer periods of time with the research assistant, as well as to seek answers more divergently and to finally come up with more solutions to the problem. These results may suggest a concordance with the mindsets theory of action phase which highlights, among other aspects, the fact that the activation of deliberative mindsets implies a more open-minded processing of available information, while the activation of implemental mindsets, a more closed-minded processing of information associated with a more accentuated tendency to take action rather than persist in gathering more details relevant for the task.

All in all this research emphasized some important differences in the way people with distinct mindsets interact one to another in the context of a teamwork activity, suggesting the hypothesis that changing mindsets from fixed to growth ones, as well as adjusting the deliberative versus implemental mindsets according to the desired goal and the situational factors, may lead to a more productive and pleasant cooperation among team members.

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