

# Influencing People's Beliefs About the Malleability of Personal Characteristics Through a Sequence of Four Loaded Multiple-Choice Questions

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The degree to which people have a growth mindset can have important beneficial consequences for their behavior, performance, and development. A growth mindset can be induced by giving people effort compliments and by training them through brief workshops. This study addresses the question whether specific questions may also be used as a tool to induce a growth mindset. Research has shown that questions loaded with certain implicit presuppositions can cause people to think and act congruently with those presuppositions. A survey containing a sequence of four multiple choice questions did indeed affect people's mindset. Version 1 of the survey started with four multiple choice questions which implicitly suggest a growth mindset. Version 2 started with four multiple choice questions which subtly implied a fixed mindset. Version 3 contained no loaded questions. Implications are discussed and suggestions for further research are given.

*Dataset (SPSS format)*

## Introduction

People differ in the extent to which they believe their personal attributes such as their intelligence and personality are malleable or fixed (Dweck, 1999). People who assume that such attributes are largely fixed are called *entity theorists* and people who believe that those characteristics are malleable are called *incremental theorists* (Dweck, Chiu, & Hong, 1995). More briefly, these beliefs are referred to respectively as a *fixed mindset* and a *growth mindset* (Dweck, 2006).

The degree to which people have a fixed mindset or a growth mindset can have important consequences for their behavior, performance, and development. A growth mindset is associated with a focus on learning goals, task enjoyment, seeking challenges, welcoming feedback, putting in extra effort when tasks are hard, persisting, bouncing back after setbacks, seeking cooperation, and focusing on improvement of oneself and others. A fixed mindset is associated with a focus on performance goals, lack of task enjoyment, being defensive, avoiding challenges, being competitive, giving up when tasks get hard, losing motivation after setbacks, and being less prepared to invest in one's own development and in the development of other people (Dweck, 2006).

Mindsets tend to be relatively stable but they are changeable (Dweck, et al., 1995). For example, the way people are given feedback can shape their mindset. Mueller and Dweck (1998) showed that intelligence praise ("You must be really smart at these problems") given to children who had done a task induced a fixed mindset while effort praise ("You must have worked hard at these problems") induced a growth mindset. Also, the subsequent behavior and performance of the children participating in the study was dramatically affected.

## Brief mindset workshops

Another way mindsets can be shaped is through a relatively brief workshop. For example, Heslin, Latham, &

VandeWalle (2005) designed a 90 minutes workshop to induce a growth mindset in managers. The structure of the workshop was based on five self-persuasion principles which were previously also used by other researchers (Aronson, Fried, & Stone, 1991; Aronson, Fried, & Good, 2002). First, a scientific testimony was delivered through a written article plus a videotape about how the brain changes when learning. Second, participants were asked to think of at least three reasons for why it's important to recognize that people can develop their abilities. Third, they were asked to think of an area in which they once had low ability but now performed well, and to explain how they had been able to make the change. Fourth, they were asked to write an email to a fictional struggling protégé about how abilities can be developed, with examples of how they themselves had dealt with career challenges. Fifth, they were asked to remember an occasion at which they had seen someone learn to do something they never thought this person could do, and to reflect upon how this had happened and what it means. The workshop led to marked changes in the managers' mindset that endured over period of six weeks as a follow-up measurement showed.

A computer-based version of this workshop (called *Brainology*) was also developed and tested. Students reported improvements in their study habits and persistence (Dweck, 2008) and significant effects on student' grades were found (Romero, Paunesku, & Dweck, 2011).

## Loaded questions

Healing & Bavelas (2011) tested the commonly held assumption that different sorts of questions can affect behavior differently. They built on McGee (1999) who proposed that questions always contain certain implicit presuppositions, unstated but logically implied assumptions which focus the person to whom the question is asked in a particular direction, and by answering the question, he or she implicitly accepts its presuppositions and cooperates in exploring its direction. An experiment was conducted in

which the differential impact was tested of two different types of questions, based on Jenkins (1990), questions that focused on personal agency and questions that focused on external causes on participants' task performance on a difficult task and on their own attributions of their task performance. The experiment showed that participants' attributions were overwhelmingly congruent with the presuppositions of the questions asked and the task performance was also differently affected. The authors conclude that "All questions are "loaded questions"; the practitioner's choice is how to "load" them with presuppositions that will be useful to the client."

Several authors have argued that subtle, indirect and implicit ways of intervening might be more effective than directly persuasive and explicit ways (e.g., deShazer, 1986, 1988). Some experiments have shown that people that people may get defensive when they sense that the communicator is trying to persuade them (Freedman & Sears, 1970; Brehm & Brehm, 1981; Miller, Burgoon, Grandpre, & Alvaro, (2006). Apparently people tend to try to protect their sense of autonomy when they feel it is threatened. Subtle, implicit interventions, such as using loaded questions may minimize the chance of resistance and may therefore be a useful intervention to induce a growth mindset.

The brief mindset workshops used some open-ended loaded questions such as "can you think of an area in which you once had low ability but now perform well, and explain how you have been able to make the change?" The question presupposes that there is in fact such an area and that the person in question has done certain things that have made it possible to become better at that activity.

The present study examines whether an even simpler and briefer form of loaded questions, multiple choice questions, can influence people's mindset. Multiple choice questions may be even less perceived as persuasive and therefore more effective. On the other hand multiple choice questions may be less activating, because respondents do have to formulate their own answers, due to which they may be less effective.

## Method

### Participants

3345 subscribers to a digital newsletter for professionals interested in the solution-focused approach (e.g. deShazer, 1985; De Jong & Berg, 2008; Visser, 2011; 2012) received an invitation to take an online survey. These subscribers were randomly assigned to one of three conditions which means that they received one of three different versions of the survey. Of the invited subscribers 291 participated and took the online survey. Of those respondents 110 had filled in version 1; 89 had filled in version 2; and 92 had filled in version 3.

Participants were asked to indicate to which age category they belonged. Of the participants 19.9% were between 25 and 44 years old; 77.6% were between 45 and 64 years old; and 2.1% were older than 65. 1.7% did not answer this question. Highest education level was asked for on a 5-point scale, ranging from 1 representing lower education levels, to 3 representing higher education levels. .3% belonged to the lower education level category; 2.4% to the average level; and 66% to the higher level. 31.3% percent did not answer this question.

### The online survey

Version 1 of the survey started with a sequence of four multiple choice questions intended to induce a growth mindset. These questions roughly corresponded to the principles on which the growth mindset workshop by Heslin et al. (2005) was based. First, a question was asked about to which extent the respondent had heard about four scientific findings associated with people's ability to learn and change (neuroplasticity, neurogenesis, deliberate practice, and lifelong learning). Second, respondents were asked to think of an area in which they once had low ability but now performed well, and then to answer which of several factors had helped to make that change (such as put in much effort, ask for help, and change one's strategy). Third, they were asked to imagine they had to encourage a struggling fifteen year old hypothetical nephew who intended to quit his school. Respondents were asked to say about a series of growth mindset type remarks to which extent they would like to say these things to this nephew. Fourth, they were asked to think about an occasion at which they had seen someone learn to do something they never thought this person could do, and then to say about a series of factors (such as work hard, seek help, get good feedback) to which extent they thought each of these factors had contributed to this change.

Version 2 of the survey started with a sequence of four multiple choice questions intended to induce a fixed mindset. This set of questions followed the structure of the questions of version 1 but were opposites of those questions. For example, version 2 contained a question about to which extent the respondent had heard about four (true) scientific findings which might give an impression that the brain is not plastic (e.g., about genetic influences on the brain, about the speed of evolutionary change, and about some structural differences in the brain of Albert Einstein). Also, it contained questions about an activity in which they had always had low ability (and still), and about reasons why someone had failed to learn a new skill.

Version 3 did not start with an intervention aimed at inducing either a growth or a fixed mindset.

All three versions of the survey contained questions intended to measure respondents' mindset. For this purpose 16 items were used. Eight of these items were from the *implicit person theory scale* (IPT) developed by Levy and Dweck (1997). This scale has four items that assess growth mindset beliefs and four items that assess fixed mindset beliefs. A sample growth mindset belief item is "People can substantially change the kind of person they are." A sample fixed mindset belief item is "Everyone is a certain kind of person, and there is not much they can really change about that." Participants rated each item on a Likert scale ranging from 1 which represented high disagreement to 6 representing high agreement. Responses to the fixed mindset-worded items were reverse-scored so that high scores represented a growth mindset IPT. The test-retest reliability of this scale been reported to .82 over a 1-week period and .71 over a four-week period (Levy & Dweck, 1997). Cronbach's alpha for this scale has been reported to be high ( $\alpha = .93$ ; Levy et al., 1998;  $\alpha = .93$ ; Heslin & VandeWalle, 2009). In the present study,  $\alpha$  was .80 when using all eight items. After two items were deleted an  $\alpha$  of .83 was found. Using the six items that remained a scale score for the IPT scale was computed by averaging the item scores.

The other eight items which were used to measure respondents' mindset were taken from the *theories of*

*intelligence scale* (TOI) for adults. This scale has four items that assess growth mindset beliefs about intelligence and four items that assess fixed mindset beliefs about intelligence. A sample growth mindset belief item is “No matter who you are, you can significantly change your intelligence level.” A sample fixed mindset belief item is “You have a certain amount of intelligence, and you can’t really do much to change it.” Participants rated each item on a Likert scale ranging from 1 which represented high disagreement to 6 representing high agreement. Responses to the fixed mindset-worded items were reverse-scored so that high scores represented a growth mindset TOI. Cronbach’s alpha for this scale was .85. After deletion of two items it was .87. Using the six remaining items scales for his TOI scale were computed by averaging the item scores.

**Results**

Table 1 shows the Cronbach’s alpha’s, intercorrelations, means, and standard deviations for the IPT and TOI scales.

Table 1  
*Intercorrelations and descriptive statistics*

	Cronbach’s alpha	IPT	TOI	Mean	SD
IPT	.83	1.00		3.60	.86
TOI	.87	.62**	1.00	3.55	.91

Note. N=294; \*\*p < .001

Two one-way analyses of variance (ANOVA) were performed to test whether there were significant differences in the mean scale scores for the three groups who took different versions of the survey. There turned out to be a significant difference in their scores on the IPT scale (F=14.75, p<.01). Post hoc analysis showed significant differences (p<.01) between group 1 and 2 (d=.71), and between group 3 and 2 (d=.68) but not between group 1 and 3.

A second one-way ANOVA showed significant differences in the mean scores on the TOI scale (F=7.49, p<.01). Post hoc analysis showed significant differences between group 1 and 2 (p<.01; d=.59) and between group 1 and 3 (p<.05; d=.29) but not between group 2 and 3. Figure 1 shows the means for the three groups on the two scales.

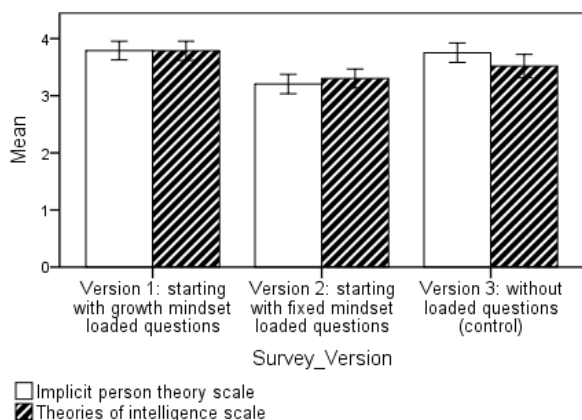


Figure 1. Graph of the means of the three groups on the two scales. Error bars represent standard errors of the mean.

Two two-way ANOVA’s were performed to examine the influence of both age and survey version on IPT and TOI. A two-way ANOVA on age and survey version on IPT showed only a main effect of survey version (F=3.179, p<.05) and neither a main effect for age nor an interaction effect between age and survey version. A two-way ANOVA of age and survey version on TOI also showed only a main effect of survey version (F=5.675, p<.01) and neither a main effect for age nor an interaction effect between age and survey version.

**Discussion**

The four questions at the beginning of version 1 and 2 of the surveys did affect respondents’ scores on the mindset scales. Compared to the control group, fixed mindset loaded multiple choice questions led to significantly lower scores on the implicit person theory scale, which refers to people’s beliefs about whether or not people are able to change as a person. Compared to the control group, growth mindset loaded multiple choice questions led to significantly higher scores on the theory of intelligence scale, which refers to people’s beliefs about the malleability of people’s intelligence. For both respondents’ implicit person theory and respondents’ theory of intelligence there were significant differences between the growth mindset loaded questions condition and the fixed mindset loaded questions condition. It is not clear why there was this differential effect from the loaded questions on the implicit person theory and the theory of intelligence.

A limitation of this study is that the data are probably influenced by a selection effect. The respondents were subscribers to a newsletter which is about the solution-focused approach to coaching. In this newsletter, however, frequent favorable attention has been paid to the growth mindset. It is possible that a substantial proportion of the respondents already had a positive attitude towards a growth mindset. The average scores on the mindset scales may therefore be relatively high. However, because the three versions of the survey were randomly sent to the subscribers, no differences between the three respondent groups were to be expected. The differences that were found can only be attributed to the differences in the intervention.

Another limitation of this study is that nothing can be said about whether and how long the found effects lasted after the survey was completed.

That interventions as brief and subtle as these types of questions can influence one’s mindset is useful to know. An intervention like this one will probably be perceived as less directly persuasive and may therefore be less likely to threaten the recipients’ sense of autonomy and thus be less likely to lead to a defensive response. In addition to this, having people answer such multiple choice questions is very cheap and fits well within an educational context. It may therefore be a useful tool to influence students’ mindsets.

Another application of questions which are loaded with growth mindset assumptions is in conversations with students or employees. Instead of directly trying to persuade students or employees to see personal attributes as malleable teachers and managers might ask growth mindset loaded questions and achieve more.

Follow up research might include other dependent variables which are closely related to the growth mindset concept, such as the extent to which people believe that effort

leads to positive outcomes, the degree to which people seek challenges, the degree to which one is focused on learning goals versus performance goals, the extent to which people respond helplessly to setbacks, and the degree to which one welcomes constructive feedback. In addition to this, more objective outcomes measures such as school grades performance at work might be used. Further, it might be interesting to examine whether an intervention through loaded questions does indeed lead to less defensiveness than interventions through direct persuasion.

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