Self-Directed Learning and Development in Adulthood:

Working Adults' Usage of and Familiarity with Generative Learning Strategies

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In our rapidly changing job landscape, the importance of continuous skill development outside of traditional work environments cannot be overstated. As industries evolve and new technologies emerge, the demand for adaptable professionals who can quickly learn and apply new knowledge is increasing. For instance, a study by the World Economic Forum projected that by 2025, over half of all employees will require significant reskilling and upskilling (i.e., the acquisition of new skills or the enhancement of existing ones; World Economic Forum, 2020). As a result, it is crucial to employ the most effective strategies in self-directed learning to stay competitive and relevant.

Despite the abundance of resources available today, many individuals fail to maximize their learning potential by not utilizing the most effective strategies. One such powerful approach is generative learning strategies. Generative learning strategies not only enhance comprehension and retention but also foster deeper understanding and the ability to transfer knowledge to different contexts (Dunlosky et al., 2013). By actively participating in the learning process through the use of generative learning strategies, individuals can significantly accelerate their skill acquisition and development. Therefore, incorporating generative learning strategies into self-directed learning endeavors is not just beneficial but essential in navigating the complexities of today's dynamic job market. However, it is not solely the individuals' lack of engagement with these strategies that hinders their learning. The self-directed learning environment itself does not push or force individuals to adopt these methods, unlike traditional training programs. Making sense of what happens at the intersection of the environment, knowledge, and self-regulation is crucial for promoting effective self-directed learning.

Currently, there is limited research on how working adults engage in self-directed learning. Therefore, this study seeks to better understand the self-directed learning strategies adults currently use and determine whether they are overestimating the effectiveness of these strategies. This research aims to make several contributions to the existing literature. By examining the combined impact of age and familiarity with generative learning strategies on beliefs about their efficacy, this study advances theoretical understanding of how aging influences perceptions of the effectiveness of generative learning strategies (Schmidt-Hertha & McCalla, 2020). Exploring this nuanced interplay, the study aims to provide deeper insights into how familiarity with effective learning strategies mediates the relationship between these factors, enriching theoretical frameworks in organizational psychology. Furthermore, through conducting a multiple mediation analysis, the study seeks to uncover patterns and relationships that contribute to a more comprehensive understanding of *when* and *why* individuals use effective self-directed learning strategies. The study's empirical findings will offer practical insights for organizations aiming to enhance employee development through self-directed learning.

Generative Learning Strategies

Generative learning strategies are instructional methods that encourage learners to actively engage with the material, creating new connections and constructing knowledge rather than passively receiving information (Fiorella & Mayer, 2016, 2020). These strategies are grounded in the theory that learning is most effective when individuals generate their own understanding through cognitive activities such as summarizing, questioning, and mapping. Fiorella and Mayer (2020) identify eight specific generative learning strategies that promote deeper understanding: summarizing, mapping, drawing, imagining, self-testing, teaching, enacting, and generating questions.

Summarizing involves condensing information into concise representations, helping learners focus on essential concepts and relationships. Mapping, which includes creating visual representations like concept maps, allows learners to organize and integrate knowledge. Drawing translates textual information into diagrams or sketches, encouraging deeper information processing. Imagining, or mentally visualizing content, aids in the retention and comprehension of information. Self-testing involves retrieval practice, helping to solidify knowledge and identify gaps in understanding. Teaching requires learners to explain material to others or prepare to teach it, promoting organization and clarity of knowledge. Enacting involves physically acting out or simulating concepts, which can enhance memory and understanding, particularly for procedural knowledge. Lastly, generating questions about the material promotes active engagement and deeper processing (Fiorella & Mayer, 2013, 2016, 2020).

The Effectiveness of Generative Learning Strategies

The effectiveness of generative learning strategies is well-supported by extensive research in cognitive psychology and educational studies. For instance, a meta-analysis by Fiorella and Mayer (2013) demonstrated that learners employing strategies like summarizing, mapping, and self-testing outperformed those using passive learning approaches in comprehension and transfer tests. These findings highlight the crucial role of generative learning strategies in facilitating meaningful self-directed learning experiences. These strategies harness cognitive processes such as active construction and organization of knowledge, resulting in enhanced learning outcomes compared to passive methods (Fiorella & Mayer, 2020). Moreover, Cognitive Load Theory posits that generative activities reduce extraneous cognitive load by focusing learners on relevant information and integrating it with prior knowledge (Sweller,

1988). By creating their own mental representations, learners effectively manage intrinsic cognitive load, which contributes to improved understanding and retention.

While educational studies, typically conducted in formal educational settings, consistently demonstrate the benefits of generative learning strategies for enhancing comprehension and retention, there exists a significant gap in understanding how these strategies apply to adults engaged in self-directed learning (i.e., career-relevant learning outside traditional educational contexts; Pressley & Levin, 1983; Hattie & Timperley, 2007). Our study aims to address this gap by exploring how working adults utilize and perceive the effectiveness of generative learning strategies in self-directed learning environments. Specifically, we seek to uncover factors influencing the adoption of these strategies and their contribution to professional development and adaptability in today's competitive job market.

Familiarity with Generative Learning Strategies

Research indicates that working adults' familiarity with generative learning strategies varies significantly. According to Dunlosky et al. (2013), many adults are aware of common learning techniques such as blocked study, highlighting, and rereading, yet these are not necessarily the most effective strategies. These techniques often create an illusion of competence in the short term without promoting deep understanding or long-term retention (Dunlosky et al., 2013). For example, blocked study (i.e., repeatedly studying the same material in one session) can lead to overconfidence in memory retrieval during practice but fails to enhance retention over time because it does not encourage active engagement or meaningful learning processes (Dunlosky et al., 2013).

In contrast, more advanced techniques, such as generative learning strategies, are less commonly known among adults but have been demonstrated to significantly enhance long-term

retention and understanding (Dunlosky et al., 2013). These advanced strategies align with principles of effective learning because they require learners to engage in active processing and retrieval of information, promoting deeper understanding and retention (Dunlosky et al., 2013). Understanding the effectiveness of these strategies is crucial for educators and learners alike, as they provide a scientifically validated approach to optimizing learning outcomes. Maurer, Weiss, and Barbeite (2003) suggest that factors such as educational background, workplace training programs, and personal interest in self-improvement play significant roles in shaping adults' awareness of different learning strategies. Their study indicates that adults with higher levels of prior education and those engaged in continuous professional development activities tend to have greater familiarity with a wider range of learning strategies.

Usage of Generative Learning Strategies

Despite varying levels of familiarity, the actual usage of learning strategies among working adults often leans towards more traditional methods. Fiorella and Mayer (2016) identify that many adults prefer passive learning techniques, such as reading and reviewing notes, over more active and generative learning methods. In their investigation, Rea et al. (2022) found that while adults can often recognize the effectiveness of strategies like self-testing and distributed practice, they frequently fail to implement these techniques consistently. Barriers to effective strategy use include a lack of time, misconceptions about learning efficacy, and insufficient training on how to apply these strategies in real-world contexts. In our study, understanding these dynamics will be crucial as we explore how these barriers manifest in the learning practices of working adults. By better understanding how adults currently engage in self-directed learning, we will be better equipped to address any potential existing barriers in employee development and promote effective learning strategies down the line.

Efficacy Beliefs About Generative Learning Strategies

The beliefs that working adults hold about the efficacy of various learning strategies can significantly influence their learning practices. McDaniel and Einstein (2020) highlight that adults often have misplaced confidence in the effectiveness of less efficient techniques, such as massed practice (cramming) and repeated exposure (rereading). These beliefs are shaped by past experiences and cultural norms around learning and studying. Dunlosky et al. (2013) provide a comprehensive review showing that generative learning strategies are empirically supported as highly effective, yet they are underutilized due to a lack of awareness and belief in their efficacy. This discrepancy between belief and evidence-based effectiveness underscores the need for better education on learning strategies. Warr and Allan (1988) emphasize that adults' learning beliefs are often influenced by the training environment and organizational culture. In environments that prioritize quick results over sustained learning, adults may lean towards immediate but less effective strategies. Conversely, workplaces that encourage continuous improvement and provide resources for learning can help shift beliefs towards more effective strategies.

As individuals age, they often develop stable learning habits and preferences (Smith & Johnson, 2018), potentially making them less receptive to incorporating newer learning strategies. Furthermore, older adults may have limited exposure to contemporary educational research and training opportunities (Brown et al., 2019), which could contribute to their reduced familiarity with generative learning strategies compared to younger adults who are more actively engaged in educational advancements. The further removed individuals are from formal educational environments, the more likely they are to rely on outdated or less effective learning strategies. As time passes, these individuals may miss out on recent advancements in educational

research and innovative learning techniques that are often integrated into contemporary curricula and training programs. Consequently, their understanding of what constitutes effective learning strategies may become less accurate compared to those who have recently engaged with up-to-date educational practices. The gap in exposure to current educational methodologies and research findings can lead to a diminished ability to accurately assess the efficacy of various learning strategies. Therefore, it is reasonable to hypothesize that the number of years since a participant was a student in an educational setting is negatively related to the accuracy of their learning strategy efficacy beliefs.

> ***Hypothesis 1:*** The number of years since a participant was a student in an educational setting is *negatively* related to the accuracy of their learning strategy efficacy beliefs.

Familiarity with generative learning strategies plays a crucial role in shaping individuals' beliefs about their efficacy. Those who have been out of formal educational settings for a longer period are less likely to be exposed to these advanced techniques, such as retrieval practice and self-explanation, which have been emphasized in more recent educational research and training programs. Without regular engagement with or exposure to these strategies, individuals may lack the knowledge and understanding needed to accurately evaluate their effectiveness. This lack of familiarity creates a disconnect between the actual benefits of generative learning strategies and individuals' beliefs about them. Thus, it is plausible to hypothesize that the relationship between an individual’s years post-education and the accuracy of their learning strategy efficacy beliefs is negatively mediated by their familiarity with these strategies, as reduced exposure over time diminishes their ability to recognize and appreciate the value of these methods.

Hypothesis 2: The relationship between an individual's years post-education and the accuracy of their learning strategy efficacy beliefs is *negatively mediated* by their familiarity with said strategies.

The practical application of generative learning strategies, such as retrieval practice and self-explanation, is integral to developing accurate beliefs about their efficacy. Individuals who have been out of formal educational settings for a longer time are less likely to actively use these advanced strategies in their daily lives or professional development. This decreased usage limits their firsthand experience with the benefits these strategies offer, such as improved retention and deeper understanding. As a result, their beliefs about the effectiveness of these strategies may be less informed and accurate. Without regular practice and reinforcement, the perceived utility of generative learning techniques diminishes, leading to less accurate efficacy beliefs. Therefore, it is hypothesized that the relationship between an individual's years post-education and the accuracy of their learning strategy efficacy beliefs is negatively mediated by their usage of these strategies, as infrequent use leads to a weaker grasp of their true benefits.

Hypothesis 3: The relationship between an individual's years post-education and the accuracy of their learning strategy efficacy beliefs is *negatively mediated* by their usage of these strategies.

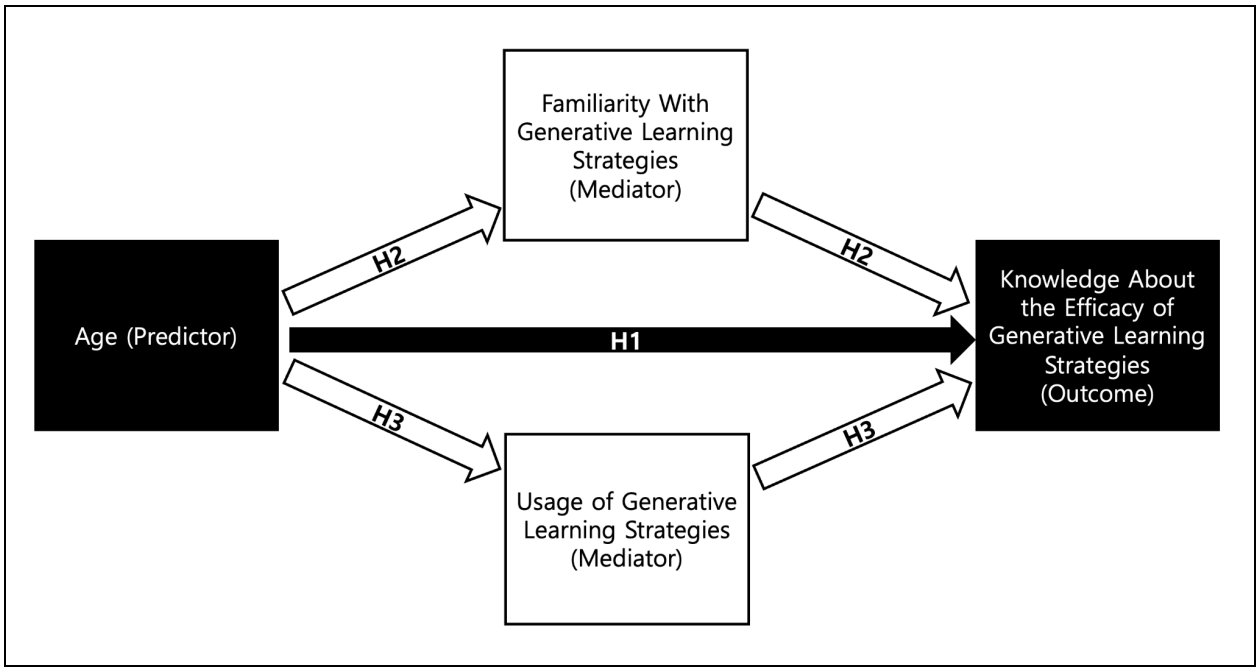


Figure 1. Hypothesized Model.

Methods

Participants

To statistically power a test of the study's hypotheses, we have drawn on the recommendations of Preacher and Hayes (2008) regarding multiple mediation models, which suggest that 150 participants, combined with bootstrapping procedures, will provide adequate power. Given this, we plan to recruit a sample of 150 participants through the online research platform Prolific. To ensure robust data collection, participants will be compensated $3.44 for their time upon completion of the study. Eligibility criteria include being at least 18 years old, residing in the United States, and being currently employed full-time or actively job seeking. These inclusion criteria for the study are important because we are specifically interested in how learning strategies affect working adults in their professional development. Approval for the study has been obtained from the university's institutional review board.

Procedure

Before completing an observational survey on the online survey platform Qualtrics, participants will first be required to complete a screener to ensure they meet the eligibility criteria for the study. Assuming they meet the study inclusion criteria, they will then be asked to provide informed consent. Following providing consent for participation in the study, they will complete a survey consisting of measures assessing their familiarity with learning strategies, knowledge about the efficacy of these strategies, and their actual usage of the strategies. Demographic information will also be collected to understand the background of the participants (e.g, gender, age, education). To ensure data quality, several attention checks will be included throughout the survey. The survey will be designed to be completed in one sitting, and will take approximately 20 minutes to complete.

Measures

All measures reported will be measured using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree) unless otherwise stated. Full scales can be found in the appendices.

Learning Strategies. To measure participants' usage, familiarity, and knowledge about the efficacy of various learning strategies, a comprehensive scale developed based on the research of Dunlosky et al. (2013), Fiorella and Mayer (2015), and Warr and Allan (1998) will be employed (See Appendix A). This scale encompasses items representing different learning strategies, such as elaborative interrogation, self-explanation, and distributed practice. After reading a description of a learning strategy, participants will rate how often they use this strategy, their degree of familiarity with the strategy, and their knowledge of how effective the strategy is.

Covariates. Due to the potential influence of individual differences on the usage, familiarity, and knowledge of effective learning strategies, several covariates will be measured.

These include personality traits, love of learning, intellectual openness, and the frequency of job-related training.

Personality Traits. Personality traits will be measured using the NEO Personality Inventory-Revised (NEO PI-R; Costa & McCrae, 1992; See Appendix B). This inventory assesses traits such as openness, conscientiousness, extraversion, agreeableness, and neuroticism. The NEO PI-R has consistently been found to be reliable with a Cronbach's Alpha of 0.89 (Costa & McCrae, 1992).

Love of Learning. This will be assessed using a scale developed by Peterson and Seligman (2003; See Appendix C), which measures an individual's intrinsic motivation to learn. Sample items include, "I enjoy learning new things" and "I seek out opportunities to learn." The Cronbach's Alpha for this scale was 0.77, indicating acceptable reliability (Peterson & Seligman, 2003).

Intellectual Openness. Intellectual openness will be measured using a scale that includes both positively and negatively keyed items to assess a broad range of intellectual engagement (Peterson & Seligman, 2003; See Appendix D). The scale includes items such as I "Carry the conversation to a higher level" and "Prefer to stick with things that I know." The Cronbach's Alpha for this scale was 0.80, indicating adequate reliability (Peterson & Seligman, 2003).

Frequency of Job-Related Training. Participants will be asked to report how often they receive job-related training. This will be measured using items adapted from Kraiger and colleagues' research (1993; See Appendix E). Questions will include "In the past six months, how many job-related training sessions have you attended?" and "How frequently do you engage in self-directed learning activities related to your job?", with response options ranging from 1 (Never) to 5 (A Great Deal).

Results

Descriptive Statistics and Preliminary Analyses. The mean age of participants was 34.8 years (SD = 13.1), with a gender distribution of 62% female, 35% male, and 3% non-binary. The average number of years since participants had completed their education was 10.3 years (SD = 11.4). The majority of participants held a bachelor's degree (34%), followed by 25.3% who had attended some college, and 15.3% who had at least a high school degree or GED.

Hypothesis Testing. I conducted a parallel mediation analysis in Jamovi to test our hypotheses regarding the relationship between years since education and the accuracy of learning strategy efficacy beliefs, with familiarity and usage of generative learning strategies as mediators. However, none of the hypotheses were supported. I did find that the usage of learning strategies was significantly related to the accuracy of learning strategy efficacy knowledge. Additionally, training frequency and personality traits were significantly correlated with both the utilization of and familiarity with learning strategies.

		Learning Strategy Familiarity	Learning Strategy Utilization	Learning Strategy Knowledge Accuracy	Self Efficacy for Learning	Intellectual Openness	Love of Learning	Conscientiousness	Workplace Training Frequency
Learning Strategy Familiarity	Pearson's r	—							
	df	—							
	p-value	—							
Learning Strategy Utilization	Pearson's r	0.632***	—						
	df	145	—						
	p-value	<.001	—						
Learning Strategy Knowledge Accuracy	Pearson's r	0.084	0.265**	—					
	df	145	145	—					
	p-value	0.309	0.001	—					
Self Efficacy for Learning	Pearson's r	0.299***	0.296***	0.064	—				
	df	145	145	145	—				
	p-value	<.001	<.001	0.443	—				
Intellectual Openness	Pearson's r	0.320***	0.167*	0.043	0.223**	—			
	df	145	145	145	148	—			
	p-value	<.001	0.043	0.601	0.006	—			
Love of Learning	Pearson's r	0.358***	0.348***	0.171*	0.293***	0.562***	—		
	df	145	145	145	148	148	—		
	p-value	<.001	<.001	0.038	<.001	<.001	—		
Conscientiousness	Pearson's r	0.230**	0.210*	0.016	0.457***	0.160	0.333***	—	
	df	145	145	145	148	148	148	—	
	p-value	0.005	0.011	0.847	<.001	0.050	<.001	—	
Workplace Training Frequency	Pearson's r	0.247**	0.283**	0.048	0.252**	0.053	0.252**	0.134	—
	df	117	117	117	120	120	120	120	—
	p-value	0.007	0.002	0.602	0.005	0.564	0.005	0.141	—

Figure 2. Correlation Matrix.

Discussion

Our hypotheses were not supported, indicating no direct relationship between years post-education and learning strategy efficacy knowledge. However, our study did find a direct relationship between learning strategy usage and the accuracy of learning strategy efficacy. In addition, training frequency and many personality-based measures revealed significant correlations with our variable of interest. Specifically, training frequency and personality traits were significantly correlated with both the utilization of and familiarity with learning strategies.

The lack of support for our hypotheses suggests that factors other than the number of years post-education might play a more significant role in determining the accuracy of learning strategy efficacy beliefs. The direct relationship found between learning strategy usage and efficacy accuracy underscores the importance of active engagement with learning strategies in maintaining accurate efficacy beliefs.

Our findings highlight the need for organizations to consider individual differences and the impact of training regimes on the effectiveness of learning strategies. Employers should focus on creating environments that encourage the frequent use of generative learning strategies and tailor training programs to individual needs and personality traits. The cross-sectional design of this study limits the ability to infer causality. Future research should consider longitudinal studies to better understand how efficacy beliefs and strategy usage evolve over time. Additionally, expanding the sample to include a more diverse range of industries and educational backgrounds could enhance the generalizability of the findings. In general, while our hypotheses were not supported, the study highlights the significant role of learning strategy usage in the accuracy of learning strategy efficacy beliefs. These findings suggest that individual differences and training regimes are crucial factors to consider in promoting effective self-directed learning. Organizations should prioritize interventions that foster the frequent use of generative learning strategies and address individual variability to enhance employee development and adaptability in a rapidly changing job market.

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Appendix A

Learning Strategies

How effective do you believe this learning strategy to be?

- ○ Low effectiveness
- ○ Moderate effectiveness
- ○ High effectiveness

Writing summaries (of various lengths) of to-be-learned texts

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am familiar with this learning strategy	○	○	○	○	○
When trying to learn, I use this strategy.	○	○	○	○	○

How effective do you believe this learning strategy to be?

- ○ Low effectiveness
- ○ Moderate effectiveness
- ○ High effectiveness

Marking potentially important portions of to-be-learned materials while reading.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am familiar with this learning strategy	○	○	○	○	○
When trying to learn, I use this strategy.	○	○	○	○	○

How effective do you believe this learning strategy to be?

- ○ Low effectiveness
- ○ Moderate effectiveness
- ○ High effectiveness

Attempting to form mental images of text materials while reading or listening

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am familiar with this learning strategy	○	○	○	○	○
When trying to learn, I use this strategy.	○	○	○	○	○
I believe this strategy to be an effective way to learn.	○	○	○	○	○

How effective do you believe this learning strategy to be?

- ○ Low effectiveness
- ○ Moderate effectiveness
- ○ High effectiveness

Rereading text material again after an initial reading

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am familiar with this learning strategy	○	○	○	○	○
When trying to learn, I use this strategy.	○	○	○	○	○
I believe this strategy to be an effective way to learn.	○	○	○	○	○

How effective do you believe this learning strategy to be?

- ○ Low effectiveness
- ○ Moderate effectiveness
- ○ High effectiveness

Self-testing or taking practice tests over to-be-learned material

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am familiar with this learning strategy	○	○	○	○	○
When trying to learn, I use this strategy.	○	○	○	○	○

How effective do you believe this learning strategy to be?

- ○ Low effectiveness
- ○ Moderate effectiveness
- ○ High effectiveness

Implementing a schedule of practice that spreads out study activities over time.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am familiar with this learning strategy	○	○	○	○	○
When trying to learn, I use this strategy.	○	○	○	○	○

How effective do you believe this learning strategy to be?

- ○ Low effectiveness
- ○ Moderate effectiveness
- ○ High effectiveness

Implementing a schedule of practice that mixes different kinds of problems, or a schedule of study that mixes different kinds of material, within a single study session.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am familiar with this learning strategy	○	○	○	○	○
When trying to learn, I use this strategy.	○	○	○	○	○

How effective do you believe this learning strategy to be?

- ○ Low effectiveness
- ○ Moderate effectiveness
- ○ High effectiveness

Going over the information in my head until I felt I knew it.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am familiar with this learning strategy	○	○	○	○	○
When trying to learn, I use this strategy.	○	○	○	○	○

How effective do you believe this learning strategy to be?

- ○ Low effectiveness
- ○ Moderate effectiveness
- ○ High effectiveness

Outlining in my mind the main points of the material and how they fit together.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am familiar with this learning strategy	○	○	○	○	○
When trying to learn, I use this strategy.	○	○	○	○	○

How effective do you believe this learning strategy to be?

- ○ Low effectiveness
- ○ Moderate effectiveness
- ○ High effectiveness

Checking with others when I was not sure about the material I was learning.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am familiar with this learning strategy	○	○	○	○	○
When trying to learn, I use this strategy.	○	○	○	○	○

How effective do you believe this learning strategy to be?

- ○ Low effectiveness
- ○ Moderate effectiveness
- ○ High effectiveness

Filling gaps in my knowledge by getting a hold of some written material.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am familiar with this learning strategy	○	○	○	○	○
When trying to learn, I use this strategy.	○	○	○	○	○

How effective do you believe this learning strategy to be?

- ○ Low effectiveness
- ○ Moderate effectiveness
- ○ High effectiveness

Trying to understand something by working it out in practice.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am familiar with this learning strategy	○	○	○	○	○
When trying to learn, I use this strategy.	○	○	○	○	○

How effective do you believe this learning strategy to be?

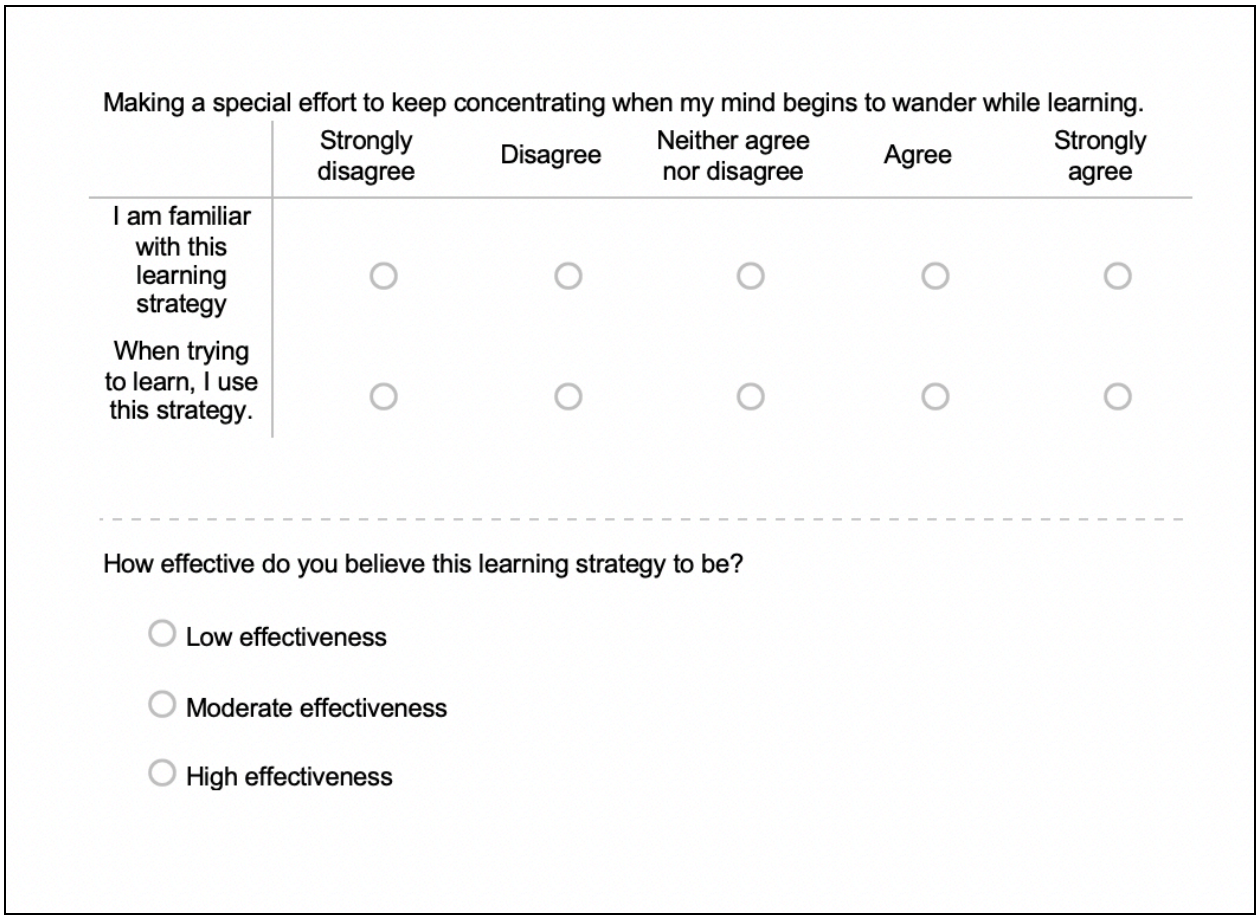
- ○ Low effectiveness
- ○ Moderate effectiveness
- ○ High effectiveness

Trying not to worry about the possibility of learning less than expected.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am familiar with this learning strategy	○	○	○	○	○
When trying to learn, I use this strategy.	○	○	○	○	○

How effective do you believe this learning strategy to be?

- ○ Low effectiveness
- ○ Moderate effectiveness
- ○ High effectiveness



Making a special effort to keep concentrating when my mind begins to wander while learning.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am familiar with this learning strategy	○	○	○	○	○
When trying to learn, I use this strategy.	○	○	○	○	○

How effective do you believe this learning strategy to be?

- ○ Low effectiveness
- ○ Moderate effectiveness
- ○ High effectiveness

Appendix B

NEO PI-R

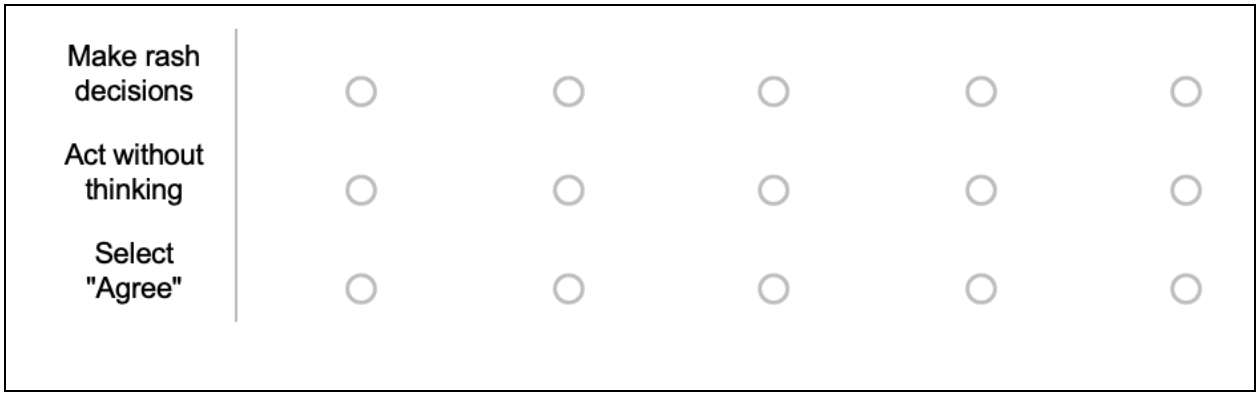
Below are some general statements that may or may not describe you. Please indicate the degree to which you disagree or agree with each statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Worry about things	○	○	○	○	○
Get stressed out easily	○	○	○	○	○
Get angry easily	○	○	○	○	○
Lose my temper	○	○	○	○	○
Often feel blue	○	○	○	○	○
Dislike myself	○	○	○	○	○
Find it difficult to approach others	○	○	○	○	○
Am easily intimidated	○	○	○	○	○
Rarely overindulge	○	○	○	○	○
Am able to control my cravings	○	○	○	○	○
Remain calm under pressure	○	○	○	○	○
Am calm even in tense situations	○	○	○	○	○
Make friends easily	○	○	○	○	○
Act comfortably with others	○	○	○	○	○

Love large parties	○	○	○	○	○
Avoid crowds	○	○	○	○	○
Take charge	○	○	○	○	○
Try to lead others	○	○	○	○	○
Am always busy	○	○	○	○	○
Am always on the go	○	○	○	○	○
Love excitement	○	○	○	○	○
Seek adventure	○	○	○	○	○
Have a lot of fun	○	○	○	○	○
Love life	○	○	○	○	○
Have a vivid imagination	○	○	○	○	○
Love to daydream	○	○	○	○	○
Believe in the importance of art	○	○	○	○	○
Do not like art	○	○	○	○	○
Experience my emotions intensely	○	○	○	○	○
Am not easily affected by my emotions	○	○	○	○	○

Prefer to stick with things that I know	○	○	○	○	○
Don't like the idea of change	○	○	○	○	○
Avoid philosophical discussions	○	○	○	○	○
Am not interested in theoretical discussions	○	○	○	○	○
Tend to vote for liberal political candidates	○	○	○	○	○
Believe in one true religion	○	○	○	○	○
Trust others	○	○	○	○	○
Believe that others have good intentions	○	○	○	○	○
Cheat to get ahead	○	○	○	○	○
Take advantage of others	○	○	○	○	○
Love to help others	○	○	○	○	○
Am concerned about others	○	○	○	○	○
Insult people	○	○	○	○	○
Get back at others	○	○	○	○	○

Believe that I am better than others	○	○	○	○	○
Think highly of myself	○	○	○	○	○
Sympathize with the homeless	○	○	○	○	○
Feel sympathy for those who are worse off than myself	○	○	○	○	○
Handles tasks smoothly	○	○	○	○	○
Know how to get things done	○	○	○	○	○
Like to tidy up	○	○	○	○	○
Leave a mess in my room	○	○	○	○	○
Tell the truth	○	○	○	○	○
Break my promises	○	○	○	○	○
Work hard	○	○	○	○	○
Set high standards for myself and others	○	○	○	○	○
Carry out my plans	○	○	○	○	○
Have difficulty starting tasks	○	○	○	○	○


Make rash decisions
Act without thinking
Select "Agree"

Appendix C

Love of Learning

Below are some general statements that may or may not describe you. Please indicate the degree to which you disagree or agree with each statement. I...

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Go out of my way to attend educational events.	○	○	○	○	○
Am thrilled when I learn something new.	○	○	○	○	○
Look forward to the opportunity to learn and grow.	○	○	○	○	○
Am a true life-long learner.	○	○	○	○	○
Read all the time.	○	○	○	○	○
Consult the library or the Internet immediately if I want to know something.	○	○	○	○	○
Read a large variety of books.	○	○	○	○	○
Don't like to learn new things.	○	○	○	○	○
Do not like to visit museums.	○	○	○	○	○
Don't read nonfiction books for fun.	○	○	○	○	○

Appendix D

Intellectual Openness

Below are some general statements that may or may not describe you. Please indicate the degree to which you disagree or agree with each statement.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Carry the conversation to a higher level.	○	○	○	○	○
Am interested in many things.	○	○	○	○	○
Prefer variety to routine.	○	○	○	○	○
Want to increase my knowledge.	○	○	○	○	○
Am open to change.	○	○	○	○	○
Prefer to stick with things that I know.	○	○	○	○	○
Am not interested in abstract ideas.	○	○	○	○	○
Am not interested in theoretical discussions.	○	○	○	○	○
Try to avoid complex people.	○	○	○	○	○
Rarely look for a deeper meaning in things.	○	○	○	○	○