



The Effect of Nature Relatedness on AI Job Replacement Anxiety Moderated by Conscientiousness

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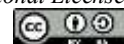
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Abstract

Technological advances, particularly artificial intelligence (AI), pose new challenges in the workplace, including AI job replacement anxiety, the anxiety of jobs being replaced by AI. This study analyzes the effect of nature relatedness on AI job replacement anxiety, with conscientiousness as a moderating variable. Using quantitative methods with the Classical Process Model technique, this study involved 229 students from the Visual Communication Design (DKV) and English Education departments at various universities in Indonesia. The results show that nature relatedness has no significant effect on AI job replacement anxiety, either directly or moderated by conscientiousness ($p\text{-value} > 0.05$). This study indicates that connectedness to nature is not related to anxiety about AI, and conscientiousness does not moderate the relationship. This study highlights the importance of other more relevant factors, such as digital literacy, work experience with AI, and employment regulations. Improved technology adaptation skills and clear policies are needed to reduce anxiety due to job automation.

Keywords: AI job replacement anxiety, conscientiousness, artificial intelligence, nature relatedness.

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Introduction

Workers worldwide must face new challenges. Having already faced the challenges of technology in their workplaces, they now face the challenges of automation, where machines operate automatically or autonomously. By 2030, an estimated 23 million jobs will be replaced by automated machines (McKinsey & Company, 2019). This is a significant number, considering that it will also require layoffs of 23 million workers, at a time when finding work is already difficult in this era.

One concrete form of automation is artificial intelligence, often shortened to AI. AI, or in Indonesian, can be interpreted as artificial intelligence, is a branch of computer science and machines capable of performing human tasks or performing tasks that can only be performed by human intelligence (Eriana & Zein, 2023). In simple contexts or simple applications, AI can answer a wide variety of questions or small tasks. These range from simple questions about recipes and biographies of famous figures to difficult questions about philosophy, and can even answer mathematical questions about algebra and logarithms.

A machine with intelligence comparable to humans, requiring less maintenance and producing greater results, is certainly a tempting proposition for companies seeking massive production. According to the International Labor Organization (2017), 56% of jobs could potentially be lost due to automation (April et al., 2021). Furthermore, in 2023, IBM and Google laid off 12,000 employees, whose jobs were replaced by AI robots (April et al., 2021).

Along with the increasing use of AI, there are concerns stemming from the phenomenon of the proliferation of AI use across all groups. One of the concerns or anxieties resulting from the emergence of AI is AI Job replacement anxiety. According to Kim et al., (2025) AI Job replacement anxiety or anxiety regarding the use of artificial intelligence is the fear or worry about new technology that has the potential to replace human jobs and the replacement of human roles with intelligent technology. This anxiety or worry regarding artificial intelligence is predominantly felt by young adults or those aged 18-25 years (Manyika et al., 2017). AI Job replacement anxiety is influenced by various factors, one of which influences the emergence of anxiety regarding artificial intelligence is work. Jobs that have a monotonous or repetitive character have a high risk of being replaced by robots or artificial intelligence (Kim et al., 2025).

The types of jobs that can be replaced by AI are those that are repetitive. An example of a job that has been replaced by AI is customer service. Nowadays, customer service is being replaced by chatbots or AI, which answer questions and provide customer satisfaction services. Another example comes from factory or assembly workers (Limna, 2023). According to the renowned automotive platform OTO (2019), one of the well-known motorcycle companies, Honda, can assemble four motorcycles in just 22 seconds. This clearly demonstrates the need for AI to pose a real job threat. This also demonstrates the need for readiness to compete with technology, as well as the ability or inclination to think critically.

Further review reveals that the anxiety caused by the fear of being replaced by AI is not only felt by workers who have manual or patterned jobs, but this anxiety is also felt by workers who involve their cognitive abilities and creative abilities (Mazzone & Elgammal, 2019). One real form of the threat of artificial intelligence to creativity is the AI Art Generator, the use of artificial intelligence dimensions that convert input words into an image or visual. The results of research conducted by Hasibuan et al., (2024) found that creative workers are worried that the market will be filled with creations by AI that make it difficult for laypeople to distinguish whether it is the result of human creation or the result of artificial intelligence creation.

AI job replacement anxiety presents several negative symptoms that individuals may experience. The impact of AI job replacement anxiety itself can lead to disruptive behaviors at work, such as decreased job satisfaction (Rhee & Jin, 2021). Another potential impact is psychological stress caused by their anxiety, which can make it difficult to perform their jobs (Rhee & Jin, 2021).

Competing with machines or AI also means that individuals are required to be able to adapt to technological changes. Individuals are required to be able to accept all technological developments and adapt in any field, including work. Research conducted by Tao & Zhang (2022) on the connection between individuals and technology shows that individuals with a high affinity for nature perceive automation, such as artificial intelligence, as a factor that can disconnect humans from nature because it is considered disrespectful of the time and effort individuals have spent creating something more natural or human-made without the intervention of artificial or man-made things.

An individual's closeness to nature can be interpreted as nature relatedness. Furthermore, nature relatedness can be interpreted as a person's belief about their relationship with nature and the ability to behave naturally in a positive way (Mayer et al., 2009). Humans themselves actually have a sense of being connected to nature without being realized by humans themselves or being in the human subconscious. The biophilia theory proposed by Wilson (1984) defines biophilia as an innate human drive to connect with life and other life processes. Humans naturally have a tendency to have an attachment and connection with nature, even when humans are increasingly distant from the environment due to developing technology, this attachment does not disappear and remains, but this urge becomes weaker and only appears occasionally and is not always realized. This attachment to nature is part of nature relatedness, but each person has a different attachment according to their experience with nature and its strengthening to nature.

Biophilia theory suggests that humans tend to act superior to nature and are able to exploit it (Wilson, 2002). Humans feel that nature is not superior to them, so they tend to feel safe because nature will not surpass their greatness. In contrast to the current situation, the presence of AI with the same greatness as humans or even surpassing humans makes humans feel less safe and causes humans to experience

anxiety. Even the emergence of AI with superpowers is predicted to erode human civilization to the point of dehumanization at worst.

This study also aims to examine how nature-relatedness is linked to a third variable, conscientiousness. This study requires a moderating variable to determine whether it can strengthen or exacerbate the relationship between AI job replacement anxiety and nature-relatedness. Conscientiousness was chosen as a moderating variable because it is a personality dimension directly related to how a person works and how they respect the environment or nature. High levels of conscientiousness influence how a person treats nature. Individuals with high levels of conscientiousness tend to be more cautious, have goals, and adhere to environmental norms, as well as tend to have pro-environmental attitudes and behaviors (Pratama, 2022).

Conscientiousness itself is crucial for humans to compete with artificial intelligence because high conscientiousness is a human personality trait that cannot be found in artificial intelligence. Personality is a distinctive human characteristic that reflects consistency in one's feelings, thoughts, and behavior (Djula, 2021). Individuals who have a positive relationship with conscientiousness tend to perform well functionally (Syakarofath, 2019). Another study conducted by Gatari & Anjani (2019) found that conscientiousness is closely related to how a person innovates in the workplace. Conscientiousness, or thoroughness and worry, also influences employee performance at the education office in Mappi Regency (Djula, 2021).

In line with research conducted by Tang et al., (2021) on employees who have direct experience working with automated machines and artificial intelligence, then linked the personality of conscientiousness with artificial intelligence or AI, and the results of this study are that the personality of employees who have a high level of conscientiousness, especially the aspect of order and regularity, will not feel a significant impact on artificial intelligence. AI will not have a major impact on people who have high order and order, because order, neatness and order will make someone not entrust the results of their work to machines or something that is automated.

Conversely, individuals with low levels of conscientiousness tend to be more open to artificial intelligence (AI) (Tang et al., 2021). Openness to AI tends to entrust all their work to AI without worrying about it making mistakes. In other words, they can accept and use AI without worrying about it replacing them. However, individuals with low levels of conscientiousness also tend to be more flexible toward AI, making them more adaptable to AI (Tang et al., 2021).

This research was conducted due to the contradiction in the nature of the object between the two variables, examining the characteristics of a person's attitude towards something scientific or something artificial. The AI Job Replacement Anxiety variable was used in this study because AI is not created naturally. This contradicts nature-relatedness, as someone with nature-relatedness can be interpreted as someone who respects nature and has a fear of something non-natural or artificial intelligence such as AI. Furthermore, nature-relatedness was used as a variable because it can reduce anxiety felt by individuals.

This study aims to examine the influence of nature-relatedness on AI job replacement anxiety, moderated by conscientiousness. Previous research has been limited in discussing atomized technology in psychology, particularly artificial intelligence, which causes anxiety. AI job replacement anxiety, and a person's relationship with nature, are intertwined. Therefore, this study can provide valuable insights into how humans respond to artificial intelligence and how their relationship with nature affects their performance in the tasks they undertake.

Methods

This study uses a quantitative method with the Classical Process Model analysis method. Quantitative research is the process of finding data results from populations and samples that have been collected, with research methods and processed using statistical analysis techniques (Sugiyono, 2016). The technique used in this study is the Classical Process Model or Process Macro Hayes technique. Hayes

process analysis itself is used to directly determine how the conscientiousness variable or moderating variable in the relationship between nature relatedness and AI job replacement anxiety.

2.1 Participants

This study used 229 respondents from university students throughout Indonesia. This study used student respondents majoring in Design, Communication, Visual, and English Education. Students are individuals currently studying at universities, institutes, or other academic institutions. Students majoring in Visual Communication Design (DKV) were chosen because nowadays, AI itself is capable of producing products with both creative and cognitive capabilities, such as the AI Art Generator (Mazzone & Elgammal, 2019). One major that has a close relationship with creative and cognitive abilities is Visual Communication Design (DKV) students. Another category of respondents was English Education students, chosen because English Education has competitors in the form of AI that can act as language translators and has the potential to replace their jobs as language translators. This study also used an accidental sampling technique where respondents were selected by chance who were met by the researcher but still met the criteria (Sugiyono, 2016).

2.2 Research Instruments

This study used three variables: nature relatedness as the dependent variable (X), AI job replacement anxiety as the independent variable, and conscientiousness as the moderating variable (M). Nature relatedness is a research component that measures how close an individual's relationship is to nature and how individuals feel and are bound to nature and respond positively to nature (Laumann et al., 2001). Nature relatedness was measured using a scale created by Nisbet et al., (2011) called the NRS or Nature Relatedness Scale. This scale was adapted and translated into Indonesian by Adiwena and Djuwita (2022). The NRS scale has 24 items and uses a Likert scale range with categories: strongly agree (SS); agree (S); neutral (N); disagree (TS); and strongly disagree (STS). There are three indicators on this scale, consisting of the NR-self, NR-perspective, and NR-experience aspects. For example, the item "I feel happy when I can look at the moon and stars at night."

AI job replacement anxiety is a dimension that describes how individuals fear that artificial intelligence will replace their jobs in the future (Kim, 2023). AI job replacement anxiety itself is measured using the AI job replacement anxiety scale developed by Li and Huang (2020). based on integrated fear acquisition theory which contains three items and one indicator, namely job replacement anxiety.

Conscientiousness in this study was measured using the IPIP-BIFM-50 scale created by Lewis Goldberg (2017). This scale was adapted into Indonesian by Akhtar and Azwar (2019) and contains a total of ten items. The conscientiousness scale uses a Likert scale with a category range of strongly agree (SS); agree (S); neutral (N); disagree (TS); strongly disagree (STS). The IPIP-BIFM-50 scale has a reliability value of 0.867 and a validity value of 0.336-0.549.

The validity and reliability of the research measuring instrument were tested using item-rest correlation. The AI job replacement anxiety scale consists of 3 items with a validity test result of 0.779-0.692 measured using item-rest correlation, then compared with the r-table value, where the r-table at a significance value of 5%, with degrees of freedom $(N-2) = 228$ (230-2) is 0.1381, thus all items in AI job replacement anxiety have been valid. The nature relatedness scale has a validity of 0.259-0.586, measured using item-rest correlation, then compared with the r-table value, where the r-table at a significance value of 5%, with degrees of freedom $(N-2) = 228$ (230-2) is 0.1381, thus all items in AI job replacement anxiety have been valid.

Nature relatedness scale has 3 invalid items, namely NR14, NR20, and NR23, these items must be removed from the measurement calculation to obtain more accurate and unbiased results. The last scale, namely the conscientiousness scale, has a validity value of 0.336-0.549 measured using item-rest correlation, then compared with the r-table value, where the r-table at a significance value of 5%, with degrees of freedom $(N-2) = 228$ (230-2) is 0.1381, thus all items in conscientiousness are valid. The Cronbach's alpha value can be used to test the reliability of items in the variable, where the Cronbach's alpha is more than 0.6 with each value in the AI job replacement anxiety variable of 0.853, the nature

relatedness scale of 0.772, the conscientiousness scale of 0.867. All reliability results show that all variables have reliable items.

2.3 Data Analysis Techniques

This research has three stages, the first stage of this research is the preparation of data collection. Preparation of data collection includes translating the scale from a foreign language into Indonesian. Then, the scale that has been translated into Indonesian will be analyzed using JASP 19.0 or a software Jeffrey's Amazing Statistics Program to produce valid and reliable items. The second stage of this research is the distribution of the scale to the subjects according to the criteria. The methods used in the distribution of this scale are two, using a digital-based in the form of a Google form and using a manual technique that is distributing paper according to the required sample target. The third process or the third stage is analyzing the collected data according to the established analysis method. In this third stage, the data will be analyzed using JASP 19.0 software with the Classical Process Model technique. The results of the analyzed data will be compiled into the discussion chapter, conclusions and strengths and weaknesses of the research.

Results

Table 1. Descriptive Statistics

	AI Job Replacement Anxiety	Conscientiousness	Nature Relatedness
Valid	229	229	229
Missing	0	0	0
Mode	9,000 ^a	30,000 ^a	63,000 ^a
Median	9,000	30,000	68,000
Mean	8,904	29,873	67,904
Standard Deviation	2,497	4,498	7,363
Minimum	3,000	18,000	47,000
Maximum	12,000	39,000	84,000

The normality test in this study uses a descriptive test by looking at the mode, median, and mean values. *The AI job replacement anxiety variable* has a mode, median, and mean range between 8,904 and 9,000, where these numbers are within one standard deviation and are not far from each other. *The conscientiousness variable* has a mode, median, and mean range between 29,873 and 30,000, where these numbers are within one standard deviation and are not far from each other. *The nature relatedness variable* has a mode, median, and mean range between 63,000 and 68,000, where these numbers are within one standard deviation and are not far from each other.

The value of R-squared indicates how big the role of independent variables and moderating variables is in explaining the influence of the dependent variable. The R-squared value in this study is 0.004 which indicates that *nature relatedness* moderated by *conscientiousness* has an influence of 0.4% on *AI job replacement anxiety*, while the remaining 99.6% is influenced by other variables outside the research being conducted.

Table 2. Classical Model Process Test or Relationship Between Variables

		Estimate	Std Error	z- Value	p	Lower	Upper
Nature Relatedness	→ AI Job Replacement	0.039	0.138	0.285	0.776	-0.230	0.309

		Anxiety						
Conscientiousness	→	AI Job Replacement Anxiety	0.143	0.310	0.461	0.645	-0.465	0.751
Nature Relatedness: Conscientiousness	→	AI Job Replacement Anxiety	-0.002	0.005	- 0.437	0.662	-0.011	0.007

Based on table. 4, it is found that the effect of *nature relatedness* on *AI job replacement anxiety* is 0.039, with a p-value of 0.776. A p-value greater than 5% or 0.05 (the degree of research error) indicates that there is no significant effect of *nature relatedness* on *AI job replacement anxiety*. The effect of *conscientiousness* on *AI job replacement anxiety* is 0.143, with a p-value of 0.645. A p-value greater than 5% or 0.05 (the degree of research error) indicates that there is no significant effect of *conscientiousness* on *AI job replacement anxiety*. Testing the moderating effect of *conscientiousness* on the relationship between *nature relatedness* and *AI job replacement anxiety* was found to be -0.002, with a p-value of 0.662. A p-value greater than 5% or 0.05 (the degree of research error) indicates that there is no moderating effect of *conscientiousness* on the relationship between *nature relatedness* and *AI job replacement anxiety*.

Table 3. Conditional Effect Tests (Direct and Indirect Effects)

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		Conscientiousness	Estimate	Std Error	z-Value	p	Lower	Upper
Nature Relatedness								
→	AI	16	-0.012	0.029	-0.422	0.673	-0.070	0.045
Job Replacement Anxiety								
Conscientiousness								
→	AI	50	-0.020	0.024	-0.862	0.389	-0.067	0.026
Job Replacement Anxiety								
Nature Relatedness:								
Conscientiousness								
→	AI	84	-0.030	0.033	-0.913	0.361	-0.095	0.035
Job Replacement Anxiety								

Based on the test results, it was found that in low *conscientiousness conditions*, the influence value was -0.012, with a *p-value* of 0.673. This indicates that in low *conscientiousness conditions*, there was no significant influence of *nature relatedness* on *AI job replacement anxiety*.

Discussion

This study aims to examine the effect of nature-relatedness on AI job replacement anxiety, moderated by conscientiousness. The results showed no direct or moderated effect of nature-relatedness on AI job replacement anxiety (*p-value* > 0.05). Nature-relatedness can be defined as a person's belief in their relationship with nature and their ability to behave in a positive, natural manner (Mayer et al., 2009). Nature-relatedness is often associated with increased mental well-being, reduced stress, and resilience to work pressure (Gritzka et al., 2020). However, in the context of AI job replacement anxiety, nature-relatedness did not show a significant effect. This is thought to be due to other factors more closely related to work and technology, such as digital literacy, work experience, and the industrial sector in which the individual works.

Conscientiousness is one of the dimensions of the Big Five personality traits that is closely related to work, especially how individuals relate to their work (Barrick & Mount, 1991). Syakarofath (2019) argues that individuals with high conscientiousness are organized, good workers, disciplined, neat, meticulous, and have strong ambitions. However, in this study, conscientiousness did not moderate the relationship between nature-relatedness and AI job replacement anxiety. One possible reason is that conscientiousness plays a greater role in how individuals manage real-world threats than in moderating the relationship between nature-relatedness and AI job replacement anxiety. Individuals with high conscientiousness may have developed more effective stress management strategies, so external factors such as connectedness to nature do not play a significant role in reducing their anxiety about AI.

One possible reason why nature relatedness has no effect on AI job replacement anxiety is that individuals are now quite familiar with AI and feel that it has become part of their new lives. Research conducted by Alkhalifah et al., (2024) argues that individuals who use AI in their daily lives have anxiety about being replaced by AI, compared to individuals who rarely use AI or only know about AI superficially. This proves that the possibility of AI use has penetrated all levels of society, including those who have a high closeness to nature who are able to work with AI in their daily lives. Individual fears and anxieties about AI in the world of work also come from the risks of complex systems that are difficult for individuals in general to understand. Risks include poorly understood system interactions between humans and ecology or the relationship between humans and nature (Downes, 2009). Individuals with low knowledge about AI tend to feel high anxiety about AI because they do not understand well how AI operates or performs its tasks (Cantas et al., 2024).

Another possible reason why nature-relatedness has no effect on AI job replacement anxiety is that many environmental activists are beginning to recognize the importance of AI technology and are using it for environmental development purposes. The AI research framework conducted by Oladeji and Mousavi (2024) by creating AI in climate change mitigation, such as AI-assisted forest fire detection, AI-assisted vegetation carbon stock assessment, reversal risk mitigation, and disaster response planning can be integrated into a comprehensive framework. Similar research was also conducted by Clemm et al., (2024) who recognized the rapid technological advances that necessitated the creation of environmentally friendly AI and addressed all environmental challenges and named it 'AI4greenAI'. The presence of research using AI coming from environmental activists in an effort to address all existing environmental problems can answer that individuals with a high affinity for nature do not necessarily experience feelings of anxiety about being replaced by AI.

In the digital era, technological development is increasing rapidly. Artificial intelligence, or AI, is a form of automation innovation where computers and machines have the ability to perform tasks that were previously only carried out by human intelligence (Eriana & Zein, 2023). The presence of AI has certainly reaped pros and cons in society. On the one hand, the presence of AI is seen as an innovation that makes human work easier, while on the other hand, it is seen as a threat that can replace the role of humans completely. This gives rise to the phenomenon of AI job replacement anxiety. This phenomenon is a form of anxiety or worry about new technology that has the potential to replace the

role of humans (Kim et al., 2025). This phenomenon is very relevant, especially in a context where there are no regulations specifically governing the use of AI in the workplace.

The absence of laws or regulations governing the use of AI in the workplace can exacerbate this anxiety and have significant social impacts. Regulations can alleviate this anxiety by providing workers with a sense of security. In the absence of clear regulations, companies can freely replace their workforce with AI without any protection mechanisms for affected workers. If left unchecked, this could increase unemployment rates, which ultimately impact other aspects, such as social and economic aspects. The lack of compensation policies or protections for affected workers further exacerbates the issue of AI job replacement anxiety.

Mazzini & Scalzo (2023) suggest the need for AI legislation that regulates data protection, sanctions against violating AI manufacturers, and the importance of human operation within the scope of professional positions and work. This regulation is expected to provide a sense of security to humans regarding the use of AI, especially in the workplace. De Almeida et al. (2021) highlight the importance of an AI regulatory framework based on ethical values, freedom, and sustainability. Without clear regulations, AI users risk creating legal uncertainty, economic inequality, and neglecting human rights (de Almeida et al., 2021; De Stefano, 2020). The International Labour Organization (ILO) proposes a human rights-based approach to AI regulation, where labor law must remain relevant in protecting workers from digital exploitation. Furthermore, the ILO emphasizes the role of collective bargaining and trade unions in regulating the implementation of AI in the workplace to ensure that decisions related to AI consider its social impacts (De Stefano, 2020).

This study has the advantage of exploring AI job replacement anxiety, a topic that has been under-discussed. It is hoped that this research will serve as a valuable resource for individuals to better understand the real job threats that can arise from the world of technology, namely AI. This study has limitations, such as the lack of literature or references that specifically discuss AI, especially AI job replacement anxiety, and its direct link to human attachment to nature. Another limitation is the lack of relevant psychological theory, and the limited number of subjects, as this study should have used workers affected by AI. Previous research has only addressed how technology relates to humans. This impacts the research results, which require further exploration of the impact of this rapid advancement of AI on humans, how it affects their performance, and their relationship with nature.

Conclusions and Implication

Nature relatedness did not significantly influence AI job replacement anxiety, which was moderated by conscientiousness. This means that individuals who felt more connected or had a strong bond with nature did not show higher or lower levels of anxiety about AI replacing their jobs, even though it was moderated by conscientiousness.

The findings of this study suggest that nature-relatedness may not be enough to reduce AI job replacement anxiety. Therefore, more effective interventions should focus on improving technological literacy, developing new skills, and establishing clear employment regulations, such as laws, to provide workers with a sense of security. Furthermore, personal and professional development programs that emphasize employability skills are needed, which can be a relevant strategy in addressing the challenges posed by AI developments.

This research is exploratory and innovative, but it has limitations that need to be considered. This research only focuses on one nature variable. Nature-relatedness, moderated by conscientiousness, influences AI job replacement anxiety. On the other hand, other variables may be more significant in influencing AI job replacement anxiety, such as technological education level, job industry, or work experience with AI (Kaya et al., 2024). Furthermore, the measurement method for nature-relatedness and AI job replacement anxiety may be influencing the results of this study, so a more holistic approach may be needed to understand this relationship more deeply. Therefore, future research is recommended to explore the role of other factors more directly related to anxiety about AI, such as digital readiness, work experience in the technology sector, or perceptions of job security. Further studies can also

examine the impact of skill-building and individual resilience-based interventions on AI job replacement anxiety.

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Authors' contributions

All authors work collaboratively and evenly.

Competing Interest

There is no conflict of interest.

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We have obtained informed consent from all individuals included in this study through google form.

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