

## Research Article

# The Effects of Virtual Reality on Ailurophobia

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**Abstract.**

Specific phobia is a type of childhood anxiety disorders that affects 20% of children and adolescents worldwide. Therefore, more in-depth research is necessary, especially considering the progressions in tools within the latest technology. The current study tested virtual reality to explore its function in substituting the fear stimulus in people with specific phobia. Given that the goal of this study is to provide both qualitative descriptions and quantitative statistics, the mixed-method research design used in it is seen to be the most efficient. The subjects included young adults that undergo ailurophobia, or a severe fear of cats. Snowball sampling instrument is employed for the sampling using scale (Severity Measure for Specific Phobia-Adult). The findings show that encountering a cat in real life and in virtual reality had no different levels of fear, which means virtual reality is capable of substituting the role of a real cat. In most statements, the participants claimed that the virtual reality cat animation made them fear for their safety.

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## 1. BACKGROUND

Specific phobia is included in the most common childhood anxiety disorders, affecting up to 20 percent of children and adolescents worldwide (Oar et al., 2019). Based on *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)*, the prevalence of specific phobia in the United States is around 7 percent until 9 percent. Whereas in Asian, African and Latin American countries, it is at 2 percent until 4 percent. In addition, in terms of gender, women are more commonly affected than men, at a rate of approximately 2:1, although the rates vary across PRABOWO, et al W3119W9355

different types of specific phobias. This means that animals, natural environments, and situational specific phobias are mostly experienced by women, while blood injection phobias and the like are experienced by both sexes.

A specific example of animal-related phobia is ailurophobia, which relates to the fear and hatred toward cats (London, 1952). Individual with this phobia may experience intense, excessive, and irrational fear of cats (Gul & Bokhari, 2022). The symptoms can

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be similar to a panic attack such as dizziness, nausea, palpitations, and dryness in the throat along with a feel of being in danger (Peristiano & Astuti, 2022). The impact of childhood specific phobia is associated with psychosocial and academic impairment (Essau et al., 2000), with an increased risk of later-onset internalizing disorders (Lieb et al., 2016). This condition is certainly a serious matter for individuals who have specific phobic disorders. They will experience lifelong impacts with repercussions that will follow.

The form of intervention to date that is often used to treat specific phobias is exposure therapy. In this intervention, the client is gradually exposed to the feared situation, both in imagination and reality (Sue et al., 2006). The second form of intervention uses systematic desensitization. This intervention is carried out by imagining situations that are frightening to the individual gradually under calm conditions (Hersen & Last, 1988). The third form of intervention commonly used in specific phobia is cognitive behavioral therapy. This intervention has been shown to effectively reduce symptoms in specific phobia (Olatunji et al., 2010). While in Indonesia, cognitive behavioral therapy interventions are also often used by various groups, this intervention model periodically evaluates what the client thinks and feels, and the behavior that appears (Purwaningtyas, 2020; Suryaningrum, 2013).

In recent years, psychological intervention research has begun to use technology as a medium or tool to assist in the intervention process. The technology used is virtual reality. Virtual reality is a computer simulation technology that allows users to interact directly with their environment digitally by describing real environmental conditions into the virtual world. Research on virtual reality shows positive results in reducing behaviour towards symptoms in specific phobias (Carl et al., 2019; Fodor et al., 2018; Morina et al., 2015; Powers & Emmelkamp, 2008).

Virtual reality has many advantages over conventional therapy. Firstly, by using virtual reality, the therapist can ensure the same degree of fear in the stimuli that scares the client so as to optimize the exposure. Second; virtual reality can be repeated continuously until the client finds

the right way to deal with his fears. Third, the therapist does not need to present the source of fear directly because it has been replaced by the virtual world. Fourth, it makes it safe for the client because the virtual world will not be able to hurt or injure the client (Olatunji et al., 2010).

From some of the explanations above about the many benefits of using virtual reality for psychological interventions, researchers are working with the Laboratory of Psychology, Muhammadiyah University of Malang to develop virtual reality-based

interventions. Currently, the laboratory has compiled a series of specific phobia therapy processes on cats using virtual reality. In this initial study, researchers wanted to test the level of individual anxiety when in real world conditions with conditions in the virtual world. This is to test the animation design made in the form of a cat whether it is able to replace real cats in the real world. The description of the animation design made can be seen in Table 1 below:

TABLE 1: Storyboard.

Level	Description
<b>Level 0</b>	Subject opens eyes in a small room with a door in front of them Subject enters the room and walks until the center of the room Subjects are expected to adapt to the room conditions first (sound, air, and surroundings)
<b>Level 1</b>	A cat appears, walking on the north-east side to the west, then stop right in the middle about three meters away from the client, the cat is in a sleeping position. The cat wakes up and then stands up, then it meows within interval time After a while, it starts walking to the west and hide in the box
<b>Level 2</b>	The cat appears from the south-east side and walks to the north side, then approaches until about two meters from the client The cat stretches its body, extending two legs forwards while yawning and showing fangs. The cat sits up and starts licking the hand to stroke its head. The cat licking the hand and looks at the subject. The cat stops and walks to the west
<b>Level 3</b>	The client turns to face the left (west side) and sees a cat walking towards the client up to one meter away The cat walks circling the client one time then meows to the client within interval times The cat walks to the east
<b>Level 4</b>	The cat comes from the west then walking around the client in within one meter range while occasionally meowing. In the third turn, the cat stops and meowing to the client. There are two cats more from the west side and behind the door walking closer to the first cat and sit in each side. The three cats meowing together several times The first cat stands up and proceeds to approach the client within 30 centimeters, eventually rest onto its belly Client squats down and tries to touch or pet the cat

## 2. RESEARCH METHODS

### 2.1. Variables or Concepts Studied

Ailurophobia is an anxiety disorder towards cats that causes intense, excessive, and irrational fear of cats (Gul & Bokhari, 2022). These fear reactions will cause significant discomfort and impairment in daily functioning.

## 2.2. Sampling Method

The sampling technique in the research uses snowball sampling. Snowball sampling technique is a sampling technique with the help of key informants. This key informant helps or will be able to develop based on the clues provided by him. In this case, the researcher only reveals the criteria as a requirement to be sampled (Creswell, 2011).

## 2.3. Research Subject

This study involved 14 female respondents aged early adulthood ( $\geq 18$  years) with a specific phobia of cats.

## 2.4. Research Instruments

The research instrument includes the measuring tools used Severity Measure for Specific Phobia-Adult (2013) adapted from American Psychological Association (APA, 2013). This scale consisted of 10 favorable items with coefficient reliability ( $\alpha$ ) was 0.841. An example items are:

*The following questions seek to understand your thoughts, feelings and behaviours that may have occurred in situations directly related to cats.*

1. *Feeling anxious, worried, or nervous when in the situation.*
2. *Feeling palpitations, sweating, difficulty breathing, weakness, or shaking when in the situation; etc.*

Another instrument engaged is a questionnaire to discover the affective, cognitive, and behavior responses of participants in two different setting (real-life and virtual reality).

## 2.5. Research Design

The use of mixed methods research design is considered the most effective in this research, because the purpose of this research is to display data descriptively qualitative and quantitative statistics. According to Creswell (2011) mixed method is a procedure for collecting, analyzing, and mixing both quantitative and qualitative methods (approaches) in a study or series of studies to understand research problems. The quantitative is supported by the SM-SPA scale, while in qualitative employs questionnaire. The instruments

were implemented in two different settings: the participants' real-life interactions with cats, and the situation they encounter in virtual reality. The virtual reality was conducted after the participant filled the SM-SPA scale and the questionnaire in real-life setting. Following the utilization of virtual reality, a second evaluation of SM-SPA scale and questionnaire in virtual reality setting was administered. The basic research design that will be used in the mix design method or in this study is an explanatory sequential design.

## 2.6. Data Collection Procedures

The stages in this study are: (1) the researcher applies for permission related to cooperation with the Laboratory of Psychology, Muhammadiyah University of Malang related to permission to use Virtual reality therapy facilities in the laboratory; (2) Researchers are looking for research subjects with predetermined criteria in this study; (3) The implementation. In this implementation stage, it will be divided into several phases so as to facilitate researchers in conducting direct observations and assessments of research subjects.

## 2.7. Data Analysis Technique

Data analysis in this study used Paired Sample T-Test to compare the fear scores between real life situation and virtual reality. The result showed a statistically significant difference ( $p < 0.05$ ), stating that participants experienced higher fear levels when encountering with real-life cats compared to their experiences in the virtual reality simulations.

## 3. RESULT

This study involved 14 female respondents aged early adulthood ( $\geq 18$  years) with a specific phobia of cats. The researcher conducted a paired simple t-test on quantitative data from the Severity Measure for Specific Phobia-Adult scale results to reveal statistical differences in the level of fear in real life and virtual reality.

Based on Table 2 output below, it is known that the average value of the real-life results is 27.36 and the virtual reality is 28.57, where there is not much difference between the two. Furthermore, it is proven whether the difference is significant by looking at the results of the paired samples test.

TABLE 2: Paired Samples Statistic.

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Real_life	27.36	14	3.319	.887
	Virtual_reality	28.57	14	5.827	1.557

Based on the output in Table 3, it is known that the two tailed significance value is 0.405 or more than 0.05, it can be inferred that there is no significant difference in the participant’s fear level.

TABLE 3: Paired Samples Test.

		t	df	Sig. (2-tailed)
Pair 1	Real-life_Virtual reality	-.861	13	.405

This finding is supported by qualitative results which are divided into 3 sub themes:

1. Affective: Participants revealed they experienced feelings of fear and anxiety when seeing the cat in person, some expressed feeling amused. While in the virtual reality situation, participants expressed similar feelings of fear, anxiety, and heart palpitations.
2. Cognitive: real-life and virtual reality data showed participants had similar thoughts towards cats either in person or in VR that they felt would approach or hurt them such as jumping towards the participant, chasing, petting or touching their body, scratching, or biting.
3. Behavior: All participants stated that they would stay away or avoid the cat when they encountered it, other actions included calling for help or screaming.

From the three sub-themes, it is known that each individual feels a real sensation towards the source of his fear of cats. Some subjects even tried to avoid the source of their fear and caused physical reactions such as cold sweat, screaming, red face, and palpitation.

## 4. DISCUSSION

Quantitatively, this study showed no significant difference in anxiety levels between seeing cats directly and cats in virtual reality (sig. = 0.405). This means that virtual reality is able to replace the object or source of fear in cat phobia so that it can be used as a therapeutic process in cat viewing anxiety. Virtual reality is considered to have a superiority over real-life or in vivo exposure when addressing specific phobia

and agoraphobia (Wechsler et al., 2019). Existing findings that virtual reality therapy produces significant behavioural changes in real-life situations and is able to reduce and treat certain phobias (Morina et al., 2015). Other studies have also shown that virtual reality has become an attractive alternative for the treatment of social phobia. When compared to conventional therapies such as cognitive behaviour therapy, exposure group therapy, in vivo exposure therapy, and waiting list, virtual reality is proven to be more effective than some of these therapies (Salehi et al., 2020).

When viewed from the mean average value of the anxiety scale, the results of the virtual reality result value are higher than the real-life, this means that the effect of VR on fear of cats is very excessive. This can happen because the design of the virtual reality effect on the cat stimulus made around the participant makes him unable to avoid the object that he is afraid of. This finding will be used as an evaluation in the next video animation design revision process. However, the current video animation design is representative enough to be used in the next therapy process.

Another finding in this study is that virtual reality is able to have a cognitive, affective and behavioral impact on individuals. In the cognitive aspect, participants felt the impact directly, such as jumping towards participants, chasing, touching their bodies, scratching and biting. In the affective aspect; individuals feel tremendous fear, this is evidenced by some participants giving up before the treatment process ends. This also led to physical reactions such as a fast-beating heart, flushed and pale face also occurred in participants after using this virtual reality. Finally, in the behavioral aspect that emerged was avoidance behavior, screaming and trying to ask for help from people around. This virtual reality technology is able to have an extraordinary impact on individuals, this is also conveyed by Zhang (2021) in his research stating that virtual reality has a positive impact on individuals, namely increasing cognitive function, attention, memory and emotions. Other research shows virtual reality can be used and proven effective for providing rehabilitation training in chronic disease patients such as stroke (Lei et al., 2019).

## 5. CONCLUSION

With the results of no difference between real-life and virtual reality conditions, the design of virtual reality therapy for ailurophobia is ready to be used for further interventions, especially virtual reality exposure therapy. However, the design of virtual reality therapy will still be evaluated periodically.

## References

- [1] American Psychiatric Association. Severity Measure for Specific Phobia—Adult. American Psychiatric Association; 2013.
- [2] Carl E, Stein AT, Levihn-Coon A, Pogue JR, Rothbaum B, Emmelkamp P, et al. Virtual reality exposure therapy for anxiety and related disorders: A meta-analysis of randomized controlled trials. *Journal of Anxiety Disorders*. 2019;61:27–36.
- [3] Diagnostic And Statistical Manual of DSM-5 <sup>TM</sup>. (n.d.).
- [4] Essau CA, Conradt J, Petermann F. Frequency, comorbidity, and psychosocial impairment of anxiety disorders in German adolescents. *Journal of Anxiety Disorders*. 2000;14(3):263–279.
- [5] Fodor LA, Coteș CD, Cuijpers P, Szamoskozi Ş, David D, Cristea IA. The effectiveness of virtual reality based interventions for symptoms of anxiety and depression: A meta-analysis. *Scientific Reports*. 2018;8(1):10323.
- [6] Gul S, Bokhari SWA. Ailurophobia-irrational fear of cats with possible treatment spotlights to a prevailing disorder. *Hamdard Journal of Pharmacy*. 2022;2(2). <https://doi.org/10.61744/hjp.v2i2.28>
- [7] Hersen M, Last CG, editors. *Child behavior therapy casebook*. Springer US; 1988. <https://doi.org/10.1007/978-1-4613-0993-2>
- [8] Lei C, Sunzi K, Dai F, Liu X, Wang Y, Zhang B, et al. Effects of virtual reality rehabilitation training on gait and balance in patients with Parkinson's disease: A systematic review. *PLoS One*. 2019;14(11):e0224819.
- [9] Lieb R, Miché M, Gloster AT, Beesdo-Baum K, Meyer AH, Wittchen HU. Impact of specific phobia on the risk of onset of mental disorders: A 10-year prospective-longitudinal community study of adolescents and young adults. *Depression and Anxiety*. 2016;33(7):667–675.
- [10] London LS. Ailurophobia and ornithophobia. *Psychiatric Quarterly*. 1952;26(3):364–371.
- [11] Morina N, Ijntema H, Meyerbröker K, Emmelkamp PM. Can virtual reality exposure therapy gains be generalized to real-life? A meta-analysis of studies applying behavioral assessments. *Behaviour Research and Therapy*. 2015;74:18–24.
- [12] Oar EL, Farrell LJ, Ollendick TH. Specific phobia. *Pediatric anxiety disorders*. Elsevier; 2019. 127–150 p.
- [13] Olatunji BO, Cisler JM, Deacon BJ. Efficacy of cognitive behavioral therapy for anxiety disorders: A review of meta-analytic findings. *Psychiatric Clinics of North America*. 2010;33(3):557–577.



- [14] Peristiano SV, Astuti K. Decreasing symptoms of specific phobias with cognitive behavior therapy. *Malaysian Mental Health Journal (Mmhj)*. 2022;1(1):12–14.
- [15] Powers MB, Emmelkamp PM. Virtual reality exposure therapy for anxiety disorders: A meta-analysis. *Journal of Anxiety Disorders*. 2008;22(3):561–569.
- [16] Purwaningtyas FD. Intervensi psikologi perilaku maladaptive: Metode Cbt Pada Penderita Fobia Kolam Renang Atau Pantai (Air) [Jurnal Penelitian Dan Pemikiran Psikologi]. *Psikosains*. 2020;15(1):1.
- [17] Salehi E, Mehrabi M, Fatehi F, Salehi A. Virtual reality therapy for social phobia: A scoping review. *Digital Personalized Health and Medicine*. 2020:713–717.
- [18] Sue D, Sue D. Sue revised by Fred Whitford SW, Wing Sue D, Sue S. HOUGHTON MIFFLIN COMPANY BOSTON NEW YORK Instructor's Resource Manual Understanding Abnormal Behavior Eighth Edition. 2006.
- [19] Suryaningrum Cognitive Behaviour Therapy (CBT) untuk Meningkatkan Gangguan. (n.d.).
- [20] Wechsler TF, Kümpers F, Mühlberger A. Inferiority or even superiority of virtual reality exposure therapy in phobias?—A systematic review and quantitative meta-analysis on randomized controlled trials specifically comparing the efficacy of virtual reality exposure to gold standard in vivo exposure in agoraphobia, specific phobia, and social phobia. *Frontiers in Psychology*. 2019;10:1758.
- [21] Zhang Q, Fu Y, Lu Y, Zhang Y, Huang Q, Yang Y, et al. Impact of virtual reality-based therapies on cognition and mental health of stroke patients: Systematic review and meta-analysis. *Journal of Medical Internet Research*. 2021;23(11):e31007.