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Effectiveness of Behavioral Therapy Based on Systematic Desensitization in Reducing Anxiety and Animal-Phobia Symptoms in Adolescents

Homayun Rajabipour[1], Hossein Fayazmanesh[2*]

[1] Docter of Veterinary Medicine (DVM), Faculty of Veterinary Medicine, Lorestan University, Khorramabad, Iran
[2] Master of Science in General Psychology, Social Development and Health Promotion Research Center, Kermanshah University of Medical Sciences, Kermanshah, Iran.

*** Corresponding author email address**: Hossein.Fayazmanesh@kums.ac.ir

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A B S T R A C T

Animal phobia is a common subtype of specific phobia and is often accompanied by marked anxiety, avoidance behavior, and functional impairment. Systematic desensitization is a behavioral intervention that combines relaxation training with gradual exposure to feared stimuli. This study examined the effectiveness of behavioral therapy based on systematic desensitization in reducing anxiety and animal-phobia symptoms among adolescents with animal phobia. A quasi-experimental pretest-posttest design with a wait-list control group was used. Twenty-seven adolescents aged 15-18 years were recruited from counseling centers in Mashhad, Iran, after a clinical screening interview guided by DSM-5 criteria for specific phobia and an elevated score on the animal-phobia item set of the Specific Phobia Questionnaire. Participants were randomly allocated to an experimental group (n = 13) or a wait-list control group (n = 14). The experimental group received eight weekly 60-minute sessions of systematic desensitization, whereas the control group received no active intervention during the study period. Outcomes were assessed using the Beck Anxiety Inventory and 10 animal-related items from the Specific Phobia Questionnaire. Data were analyzed using descriptive statistics and univariate analysis of covariance, controlling for pretest scores. After controlling for pretest scores, the experimental group showed significantly lower posttest anxiety than the control group, $F(1, 24) = 64.37$, $p < .001$, partial eta squared = .728. A significant intervention effect was also observed for animal-phobia symptoms, $F(1, 24) = 28.98$, $p < .001$, partial eta squared = .547. These findings suggest that systematic desensitization may be a useful structured intervention for reducing anxiety and animal-phobia symptoms in adolescents. However, the small sample size, reliance on self-report outcomes, lack of behavioral approach testing, and absence of follow-up assessment require cautious interpretation. Future studies with larger samples, active control conditions, clinician-rated outcomes, and follow-up assessments are recommended.

Keywords: *systematic desensitization; behavioral therapy; anxiety; animal phobia; specific phobia; adolescents*

1. Introduction

Specific phobia is characterized by excessive and persistent fear of a specific object or situation, typically accompanied by avoidance or intense distress. Animal phobia is one of the most recognizable subtypes of specific phobia and may involve marked fear of dogs, cats, insects, birds, reptiles, or other animals. Although fear of animals may have an adaptive evolutionary basis, clinically significant animal phobia is disproportionate to actual danger and can interfere with social, educational, occupational, and daily functioning (1).

Animal phobia often begins in childhood or adolescence and may persist into adulthood if not treated. Individuals with animal phobia commonly experience physiological arousal such as palpitations, trembling, sweating, nausea, or a strong urge to escape when exposed to the feared animal or even to images, sounds, or imagined contact with it. Persistent avoidance can provide short-term relief, but it also prevents corrective learning and maintains the fear response over time (2).

Behavioral theories explain the development and maintenance of phobia through classical conditioning, observational learning, information transmission, and avoidance reinforcement. A child or adolescent may acquire fear after a direct frightening encounter with an animal, after observing another person react fearfully, or after receiving repeated threatening information about the animal. Once the phobic response is established, avoidance reduces anxiety immediately and therefore reinforces the fear cycle (3). Cognitive factors also contribute to the maintenance of phobia, as affected individuals tend to overestimate threat, underestimate coping ability, and interpret bodily sensations as signs of danger (4).

Exposure-based behavioral interventions are among the most strongly supported psychological treatments for specific phobia. Their central mechanism is corrective learning: repeated, safe, and structured contact with the feared stimulus weakens the association between the stimulus and expected harm. Meta-analytic evidence has shown that psychological treatments, especially exposure-based interventions, are effective for specific phobias (5). In young people, recent evidence also supports gradual exposure protocols for reducing specific phobia symptoms (6).

Systematic desensitization, originally developed by Wolpe, is a classical behavioral treatment that combines relaxation training with gradual exposure to feared stimuli arranged in a fear hierarchy. The individual first learns relaxation skills, then imagines or encounters low-anxiety situations, and gradually progresses toward more anxiety-provoking situations while maintaining physiological calm. The method is based on reciprocal inhibition, in which relaxation and anxiety are considered incompatible responses (7).

In the context of animal phobia, systematic desensitization can be implemented through imaginal exposure, pictures or videos of the feared animal, safe observation from a distance, and controlled real-life exposure. Despite the broad evidence base for exposure therapy, fewer studies have focused specifically on animal phobia in adolescents using structured systematic desensitization protocols. Given that animal phobia may interfere with school, family, and community activities, evaluating practical and accessible behavioral interventions is clinically important. Therefore, the present study examined whether behavioral therapy based on systematic desensitization could reduce anxiety and animal-phobia symptoms among adolescents with animal phobia.

2. Methods and Materials

2.1. Study design

This study used a quasi-experimental pretest-posttest design with a wait-list control group. The independent variable was behavioral therapy based on systematic desensitization. The dependent variables were anxiety and animal-phobia symptoms. Because participants were assessed before and after the intervention and a control group was included, the design allowed estimation of intervention-related change.

2.2. Participants and sampling

The statistical population consisted of adolescents aged 15-18 years with animal phobia who attended counseling centers in Mashhad, Iran. Twenty-seven eligible participants were selected by convenience sampling and were then randomly assigned to an experimental group (n = 13) or a control group (n = 14). The experimental group included

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seven boys and six girls, and the control group included six boys and eight girls. The mean age was 16.57 +/- 0.83 years in the experimental group and 17.03 +/- 0.66 years in the control group.

2.3. *Diagnostic screening and eligibility criteria*

Eligibility was determined through a clinical screening interview guided by DSM-5 criteria for specific phobia and an elevated score on the animal-phobia item set used in this study. The interview explored the presence of persistent and excessive fear of one or more animals, immediate anxiety during exposure or anticipation, avoidance behavior, distress or functional interference, and the absence of a more suitable alternative explanation. For study entry, a score above 29 on the 10 animal-related items of the Specific Phobia Questionnaire was used as an operational threshold. Inclusion criteria were age between 15 and 18 years, clinical evidence of animal phobia based on the screening interview, an elevated score on the animal-phobia item set, willingness to participate, ability to attend treatment sessions regularly, and written informed consent from a parent or legal guardian together with adolescent assent. Participants were required not to be receiving another concurrent psychological intervention for anxiety or phobia. If psychiatric medication was being used, the dose had to be stable during the month before enrollment.

Exclusion criteria were absence from more than two treatment sessions, withdrawal of consent, incomplete questionnaire data, severe psychiatric disorder requiring specialized treatment, acute psychological crisis during the study, participation in another specialized phobia treatment, poor cooperation with the exposure protocol, or a severe physical condition preventing regular attendance.

2.4. *Measures*

Beck Anxiety Inventory (BAI). The BAI is a 21-item self-report instrument developed to assess the severity of anxiety symptoms. Each item is rated from 0 (not at all) to 3 (severely), yielding a total score from 0 to 63. Higher scores indicate greater anxiety severity. The original psychometric study reported strong internal consistency and acceptable test-retest reliability (8). In this study, the BAI was used to assess general anxiety symptoms rather than phobia-specific fear.

Specific Phobia Questionnaire (SPQ). The SPQ is a self-report measure used to assess fear and interference across different specific phobia domains. The full instrument contains 43 items rated on five-point scales, with higher scores reflecting greater fear and impairment (9). In the present study, only the 10 animal-related items were used to assess animal-phobia symptoms. Internal consistency for this shortened item set was not recalculated for the present study; therefore, this measurement limitation is considered in the interpretation of the findings.

2.5. *Intervention protocol*

The experimental group received eight weekly sessions of behavioral therapy based on systematic desensitization. Each session lasted approximately 60 minutes and was delivered by a trained therapist. The intervention was adapted from behavioral principles of systematic desensitization and dog-phobia response protocols (7, 10). It included psychoeducation about animal phobia and the anxiety cycle, relaxation training, construction of an individualized fear hierarchy, imaginal exposure, picture/video exposure, semi-real exposure, direct controlled exposure, and relapse-prevention planning. The control group received no active intervention during the eight-week study period and was treated as a wait-list control condition.

Table 1

Eight-session systematic desensitization protocol.

Session	Main objective	Core content	Home practice
1	Introduction and initial assessment	Therapeutic rapport, psychoeducation about animal phobia, the anxiety cycle, and treatment rationale.	Record feared animal-related situations and subjective anxiety.
2	Relaxation training	Diaphragmatic breathing, progressive muscle relaxation, and in-session practice.	Daily relaxation practice and anxiety monitoring.
3	Fear hierarchy construction	Identification and ranking of feared animal-related situations using subjective units of distress.	Review hierarchy and continue relaxation practice.

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4	Imaginal desensitization	Imaginal exposure to low-anxiety hierarchy items while using relaxation responses.	Practice imaginal exposure with low-anxiety scenes.
5	Picture and video exposure	Gradual exposure to pictures and videos of the feared animal while monitoring anxiety.	Controlled picture/video exposure and reaction log.
6	Semi-real exposure	Safe exposure to animal-related environments or observation from a distance.	Brief exposure to safe animal-related environments.
7	Direct controlled exposure	Gradual and controlled real-life exposure, reduction of avoidance, and strengthening coping skills.	Practice planned exposure when safe and appropriate.
8	Review and relapse prevention	Progress review, posttest assessment, relapse-prevention planning, and continuation strategies.	Continue graded exposure and relaxation in daily life.

2.6. Statistical analysis

Data were analyzed using IBM SPSS Statistics, version 27. Descriptive statistics were reported as mean and standard deviation. Before ANCOVA, normality was examined using the Shapiro-Wilk test, homogeneity of variance was assessed using Levene's test, and homogeneity of regression slopes was examined by testing the group x pretest interaction for each outcome. These assumptions were considered acceptable ($p > .05$). Univariate analysis of covariance (ANCOVA) was used to compare posttest scores between groups while controlling for the corresponding pretest score. Statistical significance was set at $p < .05$. Because the sample size was small, effect sizes were interpreted alongside p values.

3. Findings and Results

The results are presented in three parts: participant characteristics, descriptive pretest-posttest outcomes, and ANCOVA results after controlling for pretest scores.

Table 2 summarizes the demographic characteristics of the two study groups. The groups were similar in size, sex distribution, and age range.

Table 2

Demographic characteristics of participants by study group.

Group	n	Sex distribution	Mean age (years)	SD
Experimental	13	7 boys, 6 girls	16.57	0.83
Control	14	6 boys, 8 girls	17.03	0.66
Total	27	13 boys, 14 girls	-	-

As shown in Table 3, the experimental group demonstrated a marked reduction in both anxiety and animal-phobia scores from pretest to posttest. In contrast, the control group showed only minimal change over the same period. The direction of change is also displayed in Figure 1.

Table 3

Descriptive statistics for anxiety and animal-phobia outcomes.

Outcome	Group	n	Pretest M	Pretest SD	Posttest M	Posttest SD
Anxiety (BAI)	Experimental	13	47.49	3.89	33.99	4.95
Anxiety (BAI)	Control	14	46.47	4.30	46.14	4.36
Animal phobia (SPQ animal items)	Experimental	13	33.92	2.13	27.85	3.55
Animal phobia (SPQ animal items)	Control	14	32.95	2.77	33.00	3.23

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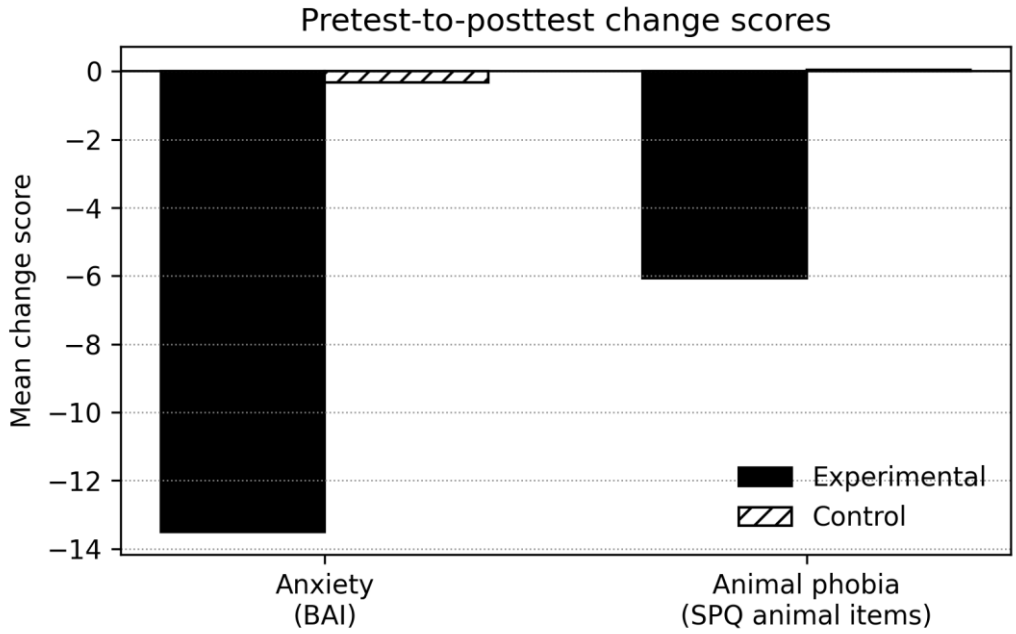
Figure 1

Mean change scores from pretest to posttest. Negative values indicate symptom reduction. The black bars represent the experimental group and the white hatched bars represent the control group.



Before ANCOVA, the assumptions of normality, homogeneity of variance, and homogeneity of regression slopes were examined and were considered acceptable ($p > .05$). After controlling for pretest scores, significant group differences were observed for both anxiety and animal-phobia symptoms. The pretest score of the same outcome was entered as the covariate in each model; Table 4 reports the adjusted group effect and model error terms.

Table 4

ANCOVA results comparing posttest scores between groups after controlling for pretest scores.

Outcome	Source	SS	df	MS	F	p	Partial eta squared
Anxiety (BAI)	Group	1075.557	1	1075.557	64.371	< .001	.728
Anxiety (BAI)	Error	401.009	24	16.709	-	-	-
Animal phobia (SPQ animal items)	Group	227.427	1	227.427	28.976	< .001	.547
Animal phobia (SPQ animal items)	Error	188.369	24	7.849	-	-	-

The effect of group on anxiety was statistically significant, $F(1, 24) = 64.371$, $p < .001$, partial eta squared = .728, indicating that systematic desensitization was associated with a substantial reduction in anxiety relative to the wait-list control condition. The effect of group on animal-phobia symptoms was also statistically significant, $F(1, 24) = 28.976$, $p < .001$, partial eta squared = .547. These findings support the short-term effectiveness of systematic desensitization in reducing both general anxiety symptoms and animal-specific phobic fear in the present sample.

4. Discussion

The present study examined the effectiveness of behavioral therapy based on systematic desensitization in adolescents with animal phobia. The findings showed that

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participants who received systematic desensitization demonstrated significantly lower anxiety and animal-phobia scores at posttest compared with the wait-list control group, after controlling for pretest scores. The intervention effects were large for both outcomes. The reduction in anxiety is consistent with behavioral learning theory. In animal phobia, feared animals are often associated with danger, disgust, injury, loss of control, or previous frightening experiences. When adolescents repeatedly avoid animal-related situations, fear may remain unchallenged. Systematic desensitization interrupts this cycle by pairing gradual exposure with relaxation responses. Through repeated exposure without negative consequences, the expected threat is disconfirmed and the conditioned fear response weakens (3, 7).

The observed reduction in animal-phobia scores also aligns with the broader evidence base for exposure-based treatment. Exposure-based interventions are considered core psychological treatments for specific phobias, and previous meta-analytic evidence has indicated that psychological approaches, particularly exposure-based procedures, can substantially reduce phobic fear and avoidance (5). Evidence from youth samples also supports the feasibility and effectiveness of gradual exposure procedures for specific phobia (6, 11).

One clinically relevant feature of systematic desensitization is its structured and gradual format. For adolescents, direct exposure to feared animals may initially be too threatening. Beginning with psychoeducation, relaxation, imaginal exposure, and picture/video exposure may increase treatment acceptability and reduce dropout risk. Gradual exposure may also support self-efficacy: as adolescents successfully complete each step of the hierarchy, they learn that anxiety can be tolerated and that feared outcomes are less likely than expected. This process is consistent with Bandura's theory of self-efficacy and with contemporary cognitive models of anxiety treatment (4, 12).

The findings have practical implications for counseling centers and school-based mental health services. Systematic desensitization is relatively low-cost, structured, and easy to teach when conducted by trained professionals. It may be particularly useful for adolescents whose phobic fear causes avoidance of daily situations, reduces participation in social or outdoor activities, or creates distress in family and school contexts.

4.1. Limitations and future directions

This study has several limitations. First, the sample size was small and participants were selected through convenience sampling from counseling centers in one city, which limits generalizability. Second, although participants were randomly assigned after selection, the design should still be interpreted cautiously because recruitment was not population-based. Third, the control group was a wait-list/no-treatment group rather than an active control condition; therefore, nonspecific therapeutic factors cannot be ruled out.

Fourth, outcomes were assessed using self-report measures only. No behavioral approach test, clinician-rated phobia severity score, parent report, or functional impairment measure was included. Therefore, it remains unclear whether questionnaire improvements corresponded to observable behavioral improvement in real animal-related situations. Fifth, the animal-phobia outcome was based on a shortened 10-item animal-related subset of the SPQ. This approach was clinically relevant to the target phobia, but the reliability of the shortened item set was not recalculated for the present study, which limits measurement certainty.

Sixth, treatment fidelity and therapist adherence were not formally assessed. Although the intervention followed a structured protocol, future studies should use a manualized treatment checklist, session monitoring, or independent fidelity ratings. Seventh, no follow-up assessment was conducted, so the durability of treatment effects remains unknown.

Future research should use larger randomized controlled designs, include active comparison groups, add behavioral and clinician-rated outcomes, report reliability for all adapted or shortened instruments, and conduct follow-up assessments to evaluate maintenance of improvement. It would also be useful to compare systematic desensitization with other exposure-based methods, virtual reality exposure, or cognitive-behavioral protocols tailored specifically to animal phobia in adolescents.

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5. Conclusion

Behavioral therapy based on systematic desensitization significantly reduced anxiety and animal-phobia symptoms among adolescents with animal phobia in this quasi-experimental study. The intervention appears to be a practical and evidence-informed approach for reducing phobic fear and avoidance when implemented in a structured and clinically supervised manner. Because of the small sample, use of a wait-list control condition, reliance on self-report measures, and lack of follow-up, the findings should be interpreted cautiously and confirmed in larger controlled studies.

Authors' Contributions

All authors contributed to the conception and design of the study, data collection, analysis and interpretation of findings, drafting and revising the manuscript, and approval of the final version.

Declaration

Artificial intelligence tools were used only for language editing and translation support in preparing the English version of the manuscript. The scientific content, data, interpretation of findings, and final responsibility for the manuscript remain with the authors.

Transparency Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

The study was conducted in accordance with ethical principles for research involving human participants and with special attention to the participation of minors. Participants and their parents or legal guardians were informed about the study aims, procedures, possible discomfort during exposure exercises, voluntary participation, confidentiality of data, and the right to withdraw at any time without penalty. Written informed consent from parents or legal guardians and assent from adolescents were obtained before participation. Data were analyzed anonymously and reported only in aggregate form.

References

1. American Psychiatric A. Diagnostic and statistical manual of mental disorders. 5th ed: American Psychiatric Publishing; 2013. {3_https://doi.org/10.1176/appi.books.9780890425596}
2. Norberg MM, Visvalingam S, Stevenson RJ, Saluja S. A review of the phenomenology, aetiology and treatment of animal phobia and insights for biophobia. People and Nature. 2024;6(3):932-44. {3_https://doi.org/10.1002/pan3.10514}
3. Mineka S, Oehlberg K. The relevance of recent developments in classical conditioning to understanding the etiology and maintenance of anxiety disorders. Acta Psychologica. 2008;127(3):567-80. {2_18226795} {3_https://doi.org/10.1016/j.actpsy.2007.11.007}
4. Beck AT, Haigh EAP. Advances in cognitive theory and therapy: The generic cognitive model. Annual Review of Clinical Psychology. 2014;10:1-24. {2_24387236} {3_https://doi.org/10.1146/annurev-clinpsy-032813-153734}
5. Wolitzky-Taylor KB, Horowitz JD, Powers MB, Telch MJ. Psychological approaches in the treatment of specific phobias: A meta-analysis. Clinical Psychology Review. 2008;28(6):1021-37. {2_18410984} {3_https://doi.org/10.1016/j.cpr.2008.02.007}
6. de Jong R, Hofs A, Lommen MJJ, van Hout WJPJ, de Jong PJ, Nauta MH. Treating specific phobia in youth: A randomized controlled microtrial comparing gradual exposure in large steps to exposure in small steps. Journal of Anxiety Disorders. 2023;96:102712. {2_37043895} {3_https://doi.org/10.1016/j.janxdis.2023.102712}
7. Wolpe J. Psychotherapy by reciprocal inhibition: Stanford University Press; 1958.
8. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: Psychometric properties. Journal of Consulting and Clinical Psychology. 1988;56(6):893-7. {2_3204199} {3_https://doi.org/10.1037/0022-006X.56.6.893}
9. Ovanessian MM, Fairbrother N, Vorstenbosch V, McCabe RE, Rowa K, Antony MM. Psychometric properties and clinical utility of the Specific Phobia Questionnaire in an anxiety disorders sample. Journal of Psychopathology and Behavioral Assessment. 2019;41(1):36-52. {3_https://doi.org/10.1007/s10862-018-9687-1}
10. Hoffmann WA, Odendaal JSJ. The effect of behavioral therapy on dog phobia response patterns. Anthrozoos. 2001;14(1):29-37. {3_https://doi.org/10.2752/089279301786999571}

Health Nexus
E-ISSN: 2981-2569

11. Ost LG, Svensson L, Hellstrom K, Lindwall R. One-session treatment of specific phobias in youths: A randomized clinical trial. Journal of Consulting and Clinical Psychology. 2001;69(5):814-24. {2_11680558} {3_https://doi.org/10.1037/0022-006X.69.5.814}
12. Bandura A. Self-efficacy: The exercise of control: W. H. Freeman; 1997.

Health Nexus
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