

Attachment Styles and Paraphilic Sexual Interests in Users of Online Dating Sites in COVID-19 Pandemic

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Abstract

This paper aims to explore the particularities of attachment styles in association with paraphilic sexual interests, such as fetishism and exhibitionism for online dating users in the context of the COVID-19 pandemic. A number of 95 voluntary participants were chosen randomly, aged between 18 and 66, with an age average of $m=40.61$, $SD= 1.11$. 38.9% of them declared they were male and 61.1% declared they were female. The data was collected with A.A.S. Adult Attachment Scale, Questionnaire of paraphilic disorders. Significant differences were obtained between attachment styles and paraphilic sexual interests for permanent users of online dating and non-users before the pandemic. No association was found between the attachment styles and the paraphilic sexual interests of permanent online dating users and non-users before the pandemic. The pandemic context is felt as a state of insecurity, determining an amplification of the entire individual traits arsenal. In this uncertain context, the state of mental alertness brings to the surface a series of hidden traits in the form of much more meaningful manifestations than in a secure environment.

Keywords: Attachment style, Paraphilic sexual interest, Online dating, COVID 19

INTRODUCTION

In the last two decades, the number of users of online dating sites has grown rapidly, and online dating in the context of COVID-19 is the key to engaging in and negotiating romantic relationships, expressing sexuality and sexual fantasies.

Online dating refers to a form of interpersonal relationship that is initiated in a computer/telephone-mediated communication context and may transition to a more intimate communication channel, i.e. telephone and face-to-face interaction. Internet communication implicit in dating sites can have positive outcomes for interpersonal interactions [1, 2], and psychological well-being [3], but despite this, there were highlighted various social problems that appear more prevalent in Internet communication compared to face-to-face communications [4, 5] paying particular attention to new and diverse antisocial behaviors that have emerged online [6, 7].

There are gaps in the literature on possible links between attachment styles and paraphilic time interests.

Studies show that at the global level, the perceived psychological distress during the phase of the COVID-19 pandemic has had a major impact on the individual, especially in terms of socialization and love relationships. (Smith, Madison, and Susan South. "Romantic attachment style and borderline personality pathology: A meta-analysis."

Clinical Psychology Review 75 (2020): 101781) [8]. Studies suggest that attachment not only plays a crucial role in individual survival but also shapes the individual's behavioral structures, thus influencing how he forms and manages his future relationships. So we can view attachment as a fundamental element of human development and a key factor in how we interact with the world and others.

Individuals' attachment schema is formed by early experiences with attachment figures, which influence attachment styles in adult relationships.

Attachment plays a crucial role in an individual's mental health. An insecure attachment style can increase

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vulnerability to certain mental health disorders and exacerbate their symptoms. Understanding attachment styles and their impact on mental health can help develop more effective interventions to prevent and treat mental health disorders.

Attachment not only influences personality development and interpersonal behavior but can also affect intimate and sexual aspects of a person's life [9].

People with a secure attachment pattern are usually comfortable with intimacy and can engage in a sexual relationship that involves both emotional and physical intimacy. These individuals are more likely to experience sexual pleasure and satisfaction, reflecting their confidence in themselves and their partner [10]. Additionally, Birnbaum [11] found that secure attachment is associated with greater frequency of sexual activity and greater sexual desire.

It is also important to emphasize that attachment influences not only sexual preferences but also sexual behavior in long-term relationships. Individuals with a secure attachment are more likely to be sexually satisfied in long-term relationships because of their ability to engage in open communication with their partners and their sense of security in the relationship [12].

The term "paraphilia" refers to atypical or extreme sexual interests. There are many types of sexual behaviors that people engage in. The most common sexual fantasies and activities focus on a limited range of desires and behaviors, but there are also certain types of atypical sexual preferences and behaviors. Recent research suggests that insecure attachment styles may be associated with the development of paraphilic sexual interests. In the study by VanBenschoten *et al.* [13] it was found that individuals with anxious attachment styles are more likely to develop paraphilic interests, perhaps as a result of an intense need to obtain validation and comfort from atypical sexual activities. Also, individuals with avoidant attachment styles may develop paraphilia as a way to maintain emotional distance by fulfilling sexual needs in a way that does not involve emotional intimacy [13]. Another theory holds that individuals with insecure attachment styles may have more difficulty regulating inappropriate sexual behavior. For example, individuals with an anxious attachment style may be so concerned with obtaining comfort that they violate their boundaries or those of others, while individuals with an avoidant attachment style may be so determined to maintain an emotional distance that they are capable of inappropriate or non-consensual sexual behavior [14].

Online dating sites allow users to customize their sexual preferences and interests, which can lead to finding more sexually compatible partners. Through online dating sites, users can communicate and learn more about potential partners before meeting in person. This preliminary stage can

help increase the level of mutual comfort and understanding, with the potential to increase subsequent sexual satisfaction.

A study carried out by Siserman *et al.* [6] highlights the perspective that the use of online dating sites or applications of this kind can be extremely attractive, as there are unlimited possibilities to meet potential romantic or sexual partners because this way of connecting is free and non-intimidating so there is a lot of flexibility there, being the perfect solution for those who do not have the opportunity to socialize in other contexts but want romantic, sexual or friendship relationships.

The feeling of being excluded from social life, as well as loneliness, are two of the important components that make the individual use online dating. Usually, people want to "give good" or "give better" [15] which is why they give as ideal an image as possible when they introduce themselves or when they create their dating profile, this being related to instinctual self-preservation.

Delcea [16] classifies online dating as computer-mediated communication that exceeds the level of affection and emotion of parallel interaction. Derogatis *et al.* [17] point of view is that forming relationships through online dating sites progresses more quickly and intimately than face-to-face relationships due to the anonymous nature of online dating.

Other research has highlighted various aspects of online romance, including cyber flirting, cybersex, and cyber cheating. There are few studies in the world that have addressed differences in sex, sexual orientation, personality types, and the need for gratification (relationship, sexual partner, distraction, etc.).

MATERIALS AND METHODS

Instruments

The data was collected with A.A.S. (Adult Attachment Scale) Questionnaire of paraphilic disorders [4].

Procedures and Methods

The questionnaires were completed between May 2019 and June 2021. The questionnaires were distributed on social networks by sending a link or by scanning a QR code with mobile phones. It is believed that the link could be shared by the respondents and other people outside my circle of knowledge, so it is considered that the study was carried out on the adult population of Romania.

Initially, there were 113 respondents. Several 18 respondents were removed from the study, who either did not answer all the study questions or answered "I do not agree" to the statement "I read the explanations and information about the research, I had the opportunity to ask clarifying questions and I agree to the provision of personal information only for statistical analysis".

Inclusion/ Exclusion Criteria

The only criteria for participating in this study were the minimum age of 18 years and being an online dating user.

Ethical Aspects

Initially, the participants were informed that their participation in this study was completely voluntary, with each participant having the possibility to withdraw from the research without any explanation. Also, the participants were made aware that the answers they provide are confidential and will only be processed for statistical purposes. All the participants gave their consent regarding the purpose of the research and their participation in the testing, as well as the aspects related to (EU) Regulation 2016/679 on the protection of natural persons concerning the processing of personal data and regarding the free circulation of this data and the repeal of Directive 95/46/CE (General Data Protection Regulation) and Law no. 506/2004 regarding the processing of personal data and the protection of private life, and regarding the research team which should administer the study in safe conditions and only for the specified purposes, the data it will provide: e-mail address (optional), socio-demographic data and subjective responses to the assessment tools.

Methods

The collected data was processed using the SPSS program (IBM SPSS Statistics). The data were analyzed by descriptive statistics, bivariate correlation analysis, and independent sample t-test.

Participants

A number of 95 voluntary participants were chosen randomly, and the collection of participants was carried out on social media networks.

The average age of the subjects involved in the research is $m=40.61$, $SD= 1.11$, and the subjects involved in the research are between 18 and 66 years old. 38.9% declared they were male ($n=37$) and 61.1% declared they were female ($n=58$).

52.6% stated that they were users of online dating sites before the pandemic, while 47.4% declared that they did not use online dating sites before the pandemic, but they used it since the Covid-19 pandemic started.

RESULTS AND DISCUSSION

Differences in Attachment Style Perceptions Between Permanent Online Dating Site Users and Users That Started After the Beginning of the Pandemic

Starting from the hypothesis that there are significant differences between permanent users of online dating sites and those who did not use online dating sites before the pandemic, in terms of attachment styles, the statistical t-test

for independent samples was used, as well as a descriptive analysis. The data are entered in **Table 1**.

Table 1. Differences in the style of Secure attachment

participants	N	Mean	Std. Dev.	t	df	Sig.	Min.	Max.
Perm. users of online dating sites	50	16,70	3,96	-3,81	93	<0,001	9	25
Non-users of online dating sites before the pandemic	45	19,60	3,37				11	25

Statistical analysis demonstrated that the existence of a difference between the average scores of people who used permanent online dating sites and those who did not before the pandemic in terms of the type of secure attachment is significant, $t = -3.81$ and $p < 0.001$. It is observed that the mean score on the secure attachment style is $m=16.70$ for people who used online dating sites permanently, compared to $m=19.60$ for people who did not use online dating sites before the pandemic. Also, the range of values for permanent users is 9 - 25, and for those who did not use online dating sites before the pandemic it is 11 - 25. A slight difference is observed in favor of those who did not use online dating services before the pandemic. The data are entered in **Table 2**.

Table 2. Differences in the style of the Avoidant Anxious-Disorganized attachment

participants	N	Mean	Std. Dev.	t	df	Sig.	Min.	Max.
Perm. users of online dating sites	50	17,88	3,77	0,34	93	>0,732	11	26
Non-users of online dating sites before the pandemic	45	17,62	3,5				10	24

The results of the statistical analysis demonstrate that the difference between the average scores of people who used permanent online dating sites and those who did not use online dating sites before the pandemic regarding the type of avoidant attachment is not significant, $t = 0.34$ and $p > 0.732$.

It is observed that the mean of avoidant attachment style scores is $m=17.88$ for people who use online dating sites permanently, compared to $m=17.62$ for people who did not use online dating sites before the pandemic. Also, the range of values for the first group is 11 – 26, and for the second one 10 - 24. A slight difference is observed in favor of those who use online dating permanently (**Table 3**).

Table 3. Differences in the Anxious-disorganized attachment style

participants	N	Mean	Std. Dev.	t	df	Sig.	Min.	Max.
Perm. users of online dating sites	50	17,68	3,70	2,76	93	<0,007	10	27
nonusers of online dating sites before the pandemic	45	15,53	3,84				9	24

The results of the statistical analysis demonstrate that the difference between the average scores of people who used permanent online dating sites and those who did not use online dating sites before the pandemic, in terms of the type of anxious-ambivalent attachment, is significant, $t = 2.76$ and $p < 0.007$.

It is observed that the average score for the anxious-ambivalent attachment style is $m=17.68$ for people who use online dating sites, compared to $m=15.53$ for people who did not use online dating sites permanently. Also, the range of values for those who use online dating sites is 10 – 27, and for those who did not use online dating sites before the pandemic it is 9 - 24. A slight difference is observed in favor of those who used the sites of online dating.

Studies highlighted that attachment styles have profound consequences for mental and physical health, as well as for the quality and stability of interpersonal relationships in adults. Thus, a secure and secure attachment style is associated with better emotional regulation, greater trust in relationships, and better relationship satisfaction. In contrast to the secure attachment style, the anxious or avoidant attachment style can often be linked to negative outcomes such as chronic stress, anxiety, or depression, as well as conflict and dissatisfaction in relationships. The differences obtained between the two groups, although statistically significant, do not differ much, which could suggest that the two groups have a similar distribution in terms of attachment styles, and could also indicate that the members of the two groups have similar ways of attaching and relating to others whether they use online dating sites or not.

The pandemic context-induced a state of insecurity, determining an amplification of the entire individual arsenal. In this uncertain context, the state of mental alertness brings to the surface a series of hidden traits in the form of much more meaningful manifestations than in a secure environment.

Differences in Perceived Paraphilic Sexual Interests Between Permanent Online Dating Users and Non-Users Before the Pandemic

There are significant differences between permanent users of online dating sites and those who did not use online dating

sites before the pandemic in terms of paraphilic sexual interest; the statistical t-test for independent samples was used, as well as the descriptive analysis (**Table 4**).

Table 4. Differences in fetishist sexual interest

participants	N	Mean	Std. Dev.	t	Df	Sig.	Min.	Max.
Perm. users of online dating sites	50	21,50	18,39	2,68	93	<0,008	0	87,50
Non-users of online dating sites before the pandemic	45	11,94	15,98				0	62,50

The results of the statistical analysis demonstrate that the difference between the average scores of people who use online dating sites permanently and those who did not use online dating sites before the pandemic in terms of fetish sexual interest is significant, $t = 2.68$ and $p < 0.008$.

It is observed that the mean score for fetishist sexual interest is $m=21.50$ for people who use online dating sites compared to $m=11.94$ for people who do not use online dating sites. Also, the range of values for those who use online dating sites permanently is 0 - 87.50, and for those who did not use online dating sites before the pandemic, it is 9 - 62.50. There is a slight difference in the favors of those who used permanent online dating sites (**Table 5**).

Table 5. Differences in exhibitionist sexual interest

participants	N	Mean	Std. Dev.	T	df	Sig.	Min.	Max.
Perm. users of online dating sites	50	9,80	20,65	3,00	93	<0,003	0	100
Non-users of online dating sites before the pandemic	45	0,44	2,98				0	20

The results of the statistical analysis demonstrate that the difference between the average scores of people who used permanent online dating sites and those who did not use online dating before the pandemic sites in terms of exhibitionist sexual interest is significant $t = 3.00$ and $p < 0.003$.

Also, it can be observed from **Table 5** that the average score for exhibitionist sexual interest is $m=9,80$ for people who used permanent online dating sites, compared to $m=0,44$ for people who did not use online dating sites before the pandemic. Also, the range of values for the first group is 0 - 100 and for the second one, it is 0 - 20. A slight difference is observed in favor of those who did not use sites with online dating services before the pandemic.

The fairly close scores of the two groups on paraphilic sexual interests may suggest that the two groups have a similar distribution of these interests. This could indicate that members of both groups similarly show attraction or interest in objects, situations, or behaviors considered unusual or atypical in a sexual context. The uncertain and restrictive context of the pandemic only fuelled an externalization of some existing features, censored and in some cases unconscious.

However, it is important to approach this topic with caution and recognize that the assessment and interpretation of sexual preferences are subjective and can vary considerably from person to person. Enjoying or engaging in paraphilic sexual interests does not necessarily indicate mental health or attachment problems. These interests can be a normal part of sexuality and can be expressed in a consensual and ethical framework regardless of the group to which the individual belongs.

The Relationship Between Attachment Styles and Fetishist and Exhibitionist Sexual Interests in Permanent Users of Online Dating and Non-Users Before the Pandemic

In order to identify a potential relationship between attachment styles and fetishist and exhibitionist sexual interests in online dating users also before pandemics and on non-users, we used the Lambda test for both the online dating users and the non-user (Table 6) [18-20].

Table 6. Association between attachment styles and paraphilic sexual interests on online dating users and non-users (Lambda Test)

	Paraphilic sexual interest	Lambda value	Sig.
Online dating users before the pandemic	Fetishist sexual interest	.214	.175
	Exhibitionist sexual interest	.369	.161
Non-users before pandemics	Fetishist sexual interest	.301	.098
	Exhibitionist sexual interest	.252	.199

Statistical analysis indicates statistically insignificant values, with the threshold of significance reached being greater than $p=0.05$. Thus, in the case of fetishism and also that of exhibitionism, we did not find any relationship with attachment styles [21, 22].

Although the influence of attachment styles on sexual behaviors and interests cannot be disputed, a more detailed analysis indicates that with regard to fetishist and exhibitionist paraphilic behaviors, this connection is not a significant one [23, 24].

Therefore, it can be concluded that fetishist and exhibitionist sexual interests are based on other determining factors such

as certain cognitive schemes, defense mechanisms, and genetic factors.

CONCLUSION

Secure attachment and paraphilic sexual interests are two distinct aspects of personality and sexual attraction. There is no scientific consensus on the relationship between them. Of course, sexual preferences can vary considerably from person to person, and certainly not all aspects of sexual attraction are influenced by secure attachment or other aspects of interpersonal relationships.

Results showed us that in the context of the pandemic, a series of already existing features manifests itself significantly in terms of the need for human relationships, but also from the perspective of sexual interests. However, understanding and properly managing these interests are important aspects of maintaining consensual and healthy relationships.

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REFERENCES

1. Abdollahpour S, Badiie Aval S, Khadivzadeh T. Do not neglect the covid-19 transmission through sexual intercourse. *J Sex Marital Ther.* 2021;47(7):731-7. doi:10.1080/0092623X.2021.1938765
2. Perry MJ, Arrington S, Neumann LM, Carrell D, Mores CN. It is currently unknown whether SARS-CoV-2 is viable in semen or whether COVID-19 damages spermatozoa. *Andrology.* 2021;9(1):30-2. doi:10.1111/andr.12831
3. Delcea C. Construction, validation, and standardization of the sexual S-On application. *Int J Sex Health.* 2022;34:196-9. doi:10.1080/19317611.2022.2017618
4. Delcea C, Siserman C. Validation and standardization of the questionnaire for evaluation of paraphilic disorders. *Rom J Leg Med.* 2020;28(1):14-20. doi:10.4323/rjlm.2020.14
5. Siserman C, Giredea C, Delcea C. The comorbidity of paraphilic disorders and rape in individuals incarcerated for sexual offences. *Rom J Leg Med.* 2020;28(3):278-82. doi:10.4323/rjlm.2020.278
6. Siserman C, Müller-Fabian A, Delcea C. The strengthening of the mother-Child relationship through group work conducted in prisons. *Rom J Leg Med.* 2021;29(2):218-26.
7. Kumar N, Janmohamed K, Nyhan K, Forastiere L, Zhang WH, Kågesten A, et al. Sexual health and COVID-19: Protocol for a scoping review. *Syst Rev.* 2021;10(1):37. doi:10.1186/s13643-021-01591-y
8. Liu WY, Jiesisibieke ZL, Chien CW, Tung TH. Association between COVID-19 and sexual health: An umbrella review. *Ann Med.* 2023;55(2):2258902. doi:10.1080/07853890.2023.2258902
9. Meherali S, Adewale B, Ali S, Kennedy M, Salami BO, Richter S, et al. Impact of the COVID-19 pandemic on adolescents' sexual and reproductive health in low- and middle-income countries. *Int J Environ Res Public Health.* 2021;18(24):13221. doi:10.3390/ijerph182413221
10. Delcea C, Stanciu C. Ad-terrorism as a change of attitude. Discourse as a form of multiculturalism in literature and communication.

- psychology and educational sciences. 3th ed. Tg. Mures: Romania; 2015. pp.574-88.
11. Gherman C, Enache A, Delcea C, Siserman C. An observational study on the parameters influencing the duration of forensic medicine expert reports in assessment of inmates' health status in view of sentence interruption on medical grounds—conducted at the Cluj-Napoca legal medicine institute between 2014 and 2018. *Rom J Leg Med.* 2019;27(2):156-62. doi:10.4323/rjlm.2019.156
 12. Banke-Thomas A, Yaya S. Looking ahead in the COVID-19 pandemic: Emerging lessons learned for sexual and reproductive health services in low- and middle-income countries. *Reprod Health.* 2021;18(1):248. doi:10.1186/s12978-021-01307-4
 13. VanBenschoten H, Kuganantham H, Larsson EC, Endler M, Thorson A, Gemzell-Danielsson K. Impact of the COVID-19 pandemic on access to and utilisation of services for sexual and reproductive health: A scoping review. *BMJ Glob Health.* 2022;7(10):e009594. doi:10.1136/bmjgh-2022-009594
 14. Dema E, Gibbs J, Clifton S, Copas AJ, Tanton C, Riddell J, et al. Initial impacts of the COVID-19 pandemic on sexual and reproductive health service use and unmet need in Britain: Findings from a quasi-representative survey (Natsal-COVID). *Lancet Public Health.* 2022;7(1):e36-47. doi:10.1016/S2468-2667(21)00253-X
 15. Koops TU, Klein V, Bei der Kellen R, Hoyer J, Löwe B, Briken P. Association of sexual dysfunction according to *DSM-5* diagnostic criteria with avoidance of and discomfort during sex in a population-based sample. *Sex Med.* 2023;11(3):qfad037. doi:10.1093/sexmed/qfad037
 16. Delcea C. Construction, validation, and standardization of the sexual-dsmapp application. *Psychiatr Res Clin Pract.* 2020;2(2):70-5. doi:10.1176/appi.prcp.20190047
 17. Derogatis LR, Revicki DA, Rosen RC, Jordan R, Lucas J, Spana C. Psychometric validation of the female sexual distress scale-desire/arousal/orgasm. *J Patient Rep Outcomes.* 2021;5(1):100. doi:10.1186/s41687-021-00359-1
 18. Derogatis L, Clayton A, Lewis-D'Agostino D, Wunderlich G, Fu Y. Validation of the female sexual distress scale-revised for assessing distress in women with hypoactive sexual desire disorder. *J Sex Med.* 2008;5(2):357-64. doi:10.1111/j.1743-6109.2007.00672.x
 19. Sonnenberg P, Clifton S, Beddows S, Field N, Soldan K, Tanton C, et al. Prevalence, risk factors, and uptake of interventions for sexually transmitted infections in Britain: Findings from the national surveys of sexual attitudes and lifestyles (Natsal). *Lancet.* 2013;382(9907):1795-806. doi:10.1016/S0140-6736(13)61947-9
 20. Pennanen-Iire C, Prereira-Lourenço M, Padoa A, Ribeirinho A, Samico A, Gressler M, et al. Sexual health implications of COVID-19 pandemic. *Sex Med Rev.* 2021;9(1):3-14. doi:10.1016/j.sxmr.2020.10.004
 21. Li G, Tang D, Song B, Wang C, Qunshan S, Xu C, et al. Impact of the COVID-19 pandemic on partner relationships and sexual and reproductive health: Cross-sectional, online survey study. *J Med Internet Res.* 2020;22(8):e20961.
 22. Li W, Li G, Xin C, Wang Y, Yang S. Challenges in the practice of sexual medicine in the time of COVID-19 in china. *J Sex Med.* 2020;17(7):1225-8. doi:10.1016/j.jsxm.2020.04.380
 23. Cohen MA, Powell AM, Coleman JS, Keller JM, Livingston A, Anderson JR. Special ambulatory gynecologic considerations in the era of coronavirus disease 2019 (COVID-19) and implications for future practice. *Am J Obstet Gynecol.* 2020;223(3):372-8. doi:10.1016/j.ajog.2020.06.006
 24. Ibarra FP, Mehrad M, Di Mauro M, Godoy MFP, Cruz EG, Nilforoushzadeh MA, et al. Impact of the COVID-19 pandemic on the sexual behavior of the population. The vision of the East and the West. *Int Braz J Urol.* 2020;46(suppl. 1):104-12. doi:10.1590/S1677-5538.IBJU.2020.S116