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Posttraumatic Characterization of Survivors
of Drug-Facilitated Sexual Assault:
Psychopathological Sequelae and Emotional Processing

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Autora: *Marta Lizarán Villalba*

Dirigido por:

Ana García Blanco

Amelia Díaz Martínez

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*Este trabajo está dedicado a todas las personas supervivientes de
agresión sexual mediante sumisión química*

*"Todos me dicen que es mejor no recordar lo que
me hicieron, pero para mí es mucho peor lo que me
imagino"*

- Participante del estudio-

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Abstract

Sexual violence constitutes a serious public health problem affecting millions of women worldwide and has profound physical, psychological, and social consequences. Within this phenomenon, drug-facilitated sexual assaults (DFSA) have gained increasing relevance due to their rise in leisure contexts and their specific characteristics: they typically affect young women without prior sexual victimization, usually occur in single episodes, and involve loss of control, confusion, and fragmented memories, which hinder trauma processing. These particularities pose unique clinical and social challenges, as survivors require specialized care to cope with the aftermath of a traumatic experience marked by extreme vulnerability and lack of control.

This thesis aims to analyze how the specific characteristics of DFSA influence post-trauma psychological profiles, sexual functioning, emotion regulation, and socio-emotional information processing, compared with those of non-DFSA. Four studies were conducted combining clinical, psychometric, and eye-tracking paradigms. The first examined PTSD symptoms and changes in sexual functioning, exploring the relationship between symptom clusters and sexual difficulties. The second compared transdiagnostic psychopathology and emotion dysregulation between DFSA and non-DFSA survivors. The third employed an eye-tracking task measuring attentional biases toward paired images (emotional versus control), and the fourth a more complex task with four simultaneous emotional images. The sample included 74 women (19 DFSA, 20 non-DFSA, and 35 controls).

Results showed that all survivors met PTSD criteria at similar rates, although DFSA survivors presented lower severity of re-experiencing, avoidance, distress, and dissociation. Both groups exhibited comparable sexual dysfunction. Beyond PTSD, a broad psychopathological profile emerged: all survivors displayed more symptoms than controls, although non-DFSA survivors showed higher anxiety and psychoticism. In emotion regulation, deficits were more generalized in non-DFSA, whereas in DFSA they focused on non-acceptance of distress.

Regarding attentional processing, when an emotional image was presented alongside a control, DFSA survivors showed a stronger tendency to engage and sustain attention toward threatening images. When four emotional images were presented simultaneously, DFSA survivors also exhibited more sustained attention to threatening scenes and reduced attention to positive ones. In contrast, non-DFSA survivors showed no clear attentional modulation in either task.

Overall, the findings indicate that, although PTSD rates and sexual dysfunction are similar, multidimensional psychopathology differs by type of assault. Non-DFSA survivors present higher PTSD symptom severity, anxiety, psychoticism, and generalized emotion dysregulation. In contrast, attentional biases toward threat characterize DFSA, whereas a lack of emotional modulation of attention is more typical of non-DFSA. Clinically and socially, these results highlight the need for a transdiagnostic approach that addresses not only PTSD, but also sexual dysfunction, broader psychopathology, and involved cognitive-affective processes. Furthermore, DFSA should be regarded as a distinct phenomenon within sexual violence, whose differentiated understanding is essential to guide research, design effective therapeutic interventions, and promote prevention and psychosocial support strategies adapted to survivors' needs.

Resumen

La violencia sexual constituye un grave problema de salud pública que afecta a millones de mujeres en todo el mundo y tiene profundas repercusiones físicas, psicológicas y sociales. Dentro de este fenómeno, las agresiones sexuales facilitadas por drogas (DFSA) han adquirido creciente relevancia debido a su aumento en contextos de ocio y a sus características específicas: suelen afectar a mujeres jóvenes sin antecedentes de violencia sexual, ocurren habitualmente en episodios únicos y conllevan pérdida de control, confusión y recuerdos fragmentados, lo que dificulta el procesamiento del trauma. Estas particularidades plantean retos clínicos y sociales singulares, ya que las supervivientes requieren atención especializada para afrontar las secuelas de una experiencia traumática marcada por la vulnerabilidad extrema y la ausencia de control.

El objetivo de esta tesis es analizar cómo las particularidades de la DFSA influyen en los perfiles psicológicos post-trauma, el funcionamiento sexual, la regulación emocional y el procesamiento de la información socioemocional, en comparación con la no-DFSA. Para ello se realizaron cuatro estudios que combinaron instrumentos clínicos, psicométricos y paradigmas de eye-tracking. El primero examinó síntomas de TEPT y cambios en el funcionamiento sexual, explorando la relación entre sus clústeres y las dificultades sexuales. El segundo comparó la psicopatología transdiagnóstica y la desregulación emocional entre supervivientes de DFSA y no-DFSA. El tercero empleó una tarea de eye-tracking que mide sesgos atencionales hacia parejas de imágenes (emocionales versus control), y el cuarto una tarea más compleja con cuatro imágenes emocionales simultáneas. La muestra incluyó 74 mujeres (19 DFSA, 20 no-DFSA y 35 controles).

Los resultados mostraron que todas las supervivientes cumplían criterios de TEPT en tasas similares, aunque las de DFSA presentaron menor gravedad de reexperimentación, evitación, malestar y disociación. Ambos grupos mostraron deterioro comparable del funcionamiento sexual. Más allá del TEPT, se observó un perfil psicopatológico amplio: todas las supervivientes presentaron más síntomas que las controles, aunque las de no-DFSA destacaron en ansiedad y

psicoticismo. En regulación emocional, los déficits fueron más generalizados en no-DFSA, mientras que en DFSA se concentraron en la no aceptación del malestar.

Respecto al procesamiento atencional, cuando se presentaba una imagen emocional junto con una control, las supervivientes de DFSA mostraban mayor compromiso atencional y atención sostenida en las imágenes amenazantes. Cuando se presentaban cuatro imágenes emocionales simultáneamente, el grupo de DFSA mostró también una atención sostenida más marcada hacia escenas amenazantes y menor atención a las positivas. En cambio, las no-DFSA no evidenciaron modulación atencional clara en ninguno de los estudios.

En conjunto, los hallazgos evidencian que, aunque las tasas de TEPT y disfunción sexual son similares, la psicopatología multidimensional difiere según el tipo de agresión. Las supervivientes de no-DFSA presentan mayor gravedad de síntomas TEPT, ansiedad y psicoticismo, y desregulación emocional generalizada. Sin embargo, los sesgos atencionales hacia la amenaza son característicos de la DFSA, mientras que la falta de modulación emocional de la atención es más propia de la no-DFSA. Desde un punto de vista clínico y social, estos resultados subrayan la necesidad de un abordaje transdiagnóstico, que contemple no solo el TEPT, sino también la disfunción sexual, la psicopatología más amplia y los procesos cognitivo-afectivos implicados. Asimismo, la DFSA debe ser considerada un fenómeno con entidad propia dentro de la violencia sexual, cuya comprensión diferenciada resulta esencial para orientar la investigación, diseñar intervenciones terapéuticas eficaces y promover estrategias de prevención y apoyo psicosocial adaptadas a las necesidades de las supervivientes.

Resum

La violència sexual constitueix un greu problema de salut pública que afecta milions de dones a tot el món i té profundes repercussions físiques, psicològiques i socials. Dins d'aquest fenomen, les agressions sexuals facilitades per drogues (DFSA) han adquirit una rellevància creixent a causa del seu augment en contextos d'oci i de les seues característiques específiques: solen afectar dones joves sense antecedents de violència sexual, normalment ocorren en episodis únics i impliquen pèrdua de control, confusió i records fragmentats, fet que dificulta el processament del trauma. Aquestes particularitats plantegen reptes clínics i socials singulars, ja que les supervivents requereixen atenció especialitzada per afrontar les seqüeles d'una experiència traumàtica marcada per la vulnerabilitat extrema i l'absència de control.

L'objectiu d'aquesta tesi és analitzar com les particularitats de la DFSA influeixen en els perfils psicològics post-trauma, el funcionament sexual, la regulació emocional i el processament de la informació socioemocional, en comparació amb la no-DFSA. Per a això es van realitzar quatre estudis que van combinar instruments clínics, psicomètrics i paradigmes d'eye-tracking. El primer va examinar símptomes de TEPT i canvis en el funcionament sexual, explorant la relació entre els seus clústers i les dificultats sexuals. El segon va comparar la psicopatologia transdiagnòstica i la desregulació emocional entre supervivents de DFSA i no-DFSA. El tercer va utilitzar una tasca d'eye-tracking que mesura biaixos atencionals cap a parells d'imatges (emocionals versus control), i el quart una tasca més complexa amb quatre imatges emocionals simultànies. La mostra va incloure 74 dones (19 DFSA, 20 no-DFSA i 35 controls).

Els resultats van mostrar que totes les supervivents complien els criteris de TEPT en taxes similars, encara que les de DFSA presentaven menor gravetat de reexperimentació, evitació, malestar i dissociació. Ambdós grups van mostrar un deteriorament comparable del funcionament sexual. Més enllà del TEPT, es va observar un perfil psicopatològic ampli: totes les supervivents presentaven més símptomes que els controls, encara que les de no-DFSA destacaven en ansietat i psicoticisme. En regulació emocional, els dèficits van ser més generalitzats en

no-DFSA, mentre que en DFSA es concentraven en la no-acceptació del malestar.

Respecte al processament atencional, quan es presentava una imatge emocional junt amb una de control, les supervivents de DFSA mostraven una major compromís atencional i atenció sostinguda cap a les imatges amenaçadores. Quan es presentaven quatre imatges emocionals simultàniament, el grup DFSA també va mostrar una atenció sostinguda més marcada cap a escenes amenaçadores i menor atenció a les positives. En canvi, les no-DFSA no van evidenciar modulació atencional clara en cap de les tasques.

En conjunt, els resultats evidencien que, encara que les taxes de TEPT i disfunció sexual són similars, la psicopatologia multidimensional difereix segons el tipus d'agressió. Les supervivents de no-DFSA presenten major gravetat de símptomes de TEPT, ansietat i psicoticisme, i desregulació emocional generalitzada. Tanmateix, els biaixos atencionals cap a l'amenaça són característics de la DFSA, mentre que la manca de modulació emocional de l'atenció és més pròpia de la no-DFSA. Des d'un punt de vista clínic i social, aquests resultats subratllen la necessitat d'un abordatge transdiagnòstic que contempli no sols el TEPT, sinó també la disfunció sexual, la psicopatologia més àmplia i els processos cognitiu-afectius implicats. Així mateix, la DFSA ha de ser considerada un fenomen amb entitat pròpia dins de la violència sexual, la comprensió diferenciada del qual és essencial per orientar la recerca, dissenyar intervencions terapèutiques efectives i promoure estratègies de prevenció i suport psicosocial adaptades a les necessitats de les supervivents.

Resumen ampliado

Marco teórico:

La violencia sexual constituye una de las formas más graves y frecuentes de trauma interpersonal, con importantes repercusiones en la salud mental y física de las personas que la sufren. Según organismos mundiales como el Fondo Internacional de Emergencia de las Naciones Unidas para la Infancia (UNICEF) y la Organización Mundial de la Salud (OMS), la violencia sexual es considerada un problema de salud de primer orden y afecta a millones de mujeres en todo el mundo. Más allá de las consecuencias físicas inmediatas, como los problemas en el funcionamiento sexual, la agresión sexual (AS) se asocia de manera consistente con un amplio espectro de secuelas psicológicas, entre las que destaca el trastorno por estrés postraumático (TEPT) como una de las más frecuentes. Estas secuelas más allá del TEPT o la disfunción sexual se explican, en parte, por la naturaleza interpersonal de la agresión, que interfiere de manera directa en los procesos de regulación emocional y en la percepción de seguridad y control personal. No obstante, las consecuencias de la AS no son homogéneas: varían en función de las circunstancias en las que ocurre el asalto y de las características individuales de las personas agredidas. En este sentido, la AS mediante sumisión química, o facilitada por drogas (DFSA, por sus siglas en inglés), ha adquirido creciente relevancia social debido a su aumento en contextos sociales y a sus rasgos específicos; sin embargo, continúa siendo un fenómeno escasamente investigado.

La DFSA se produce cuando la víctima se encuentra incapacitada para consentir debido a la ingesta, voluntaria o involuntaria, de alcohol, fármacos u otras sustancias. Este subtipo de agresión afecta de forma particular a mujeres jóvenes en torno a los 30 años sin antecedentes de violencia sexual, suele darse en entornos de ocio nocturno y se caracteriza por ser mayoritariamente un episodio único que culmina con la penetración sexual. La particularidad de la DFSA plantea retos clínicos y científicos específicos, ya que las supervivientes suelen presentar recuerdos fragmentados, confusión respecto a los hechos y

una marcada sensación de pérdida de control sobre el propio cuerpo. Estas dificultades pueden interferir en la vivencia del suceso y en la forma en que la superviviente procesa y elabora el trauma, impidiendo la construcción de un relato coherente del trauma y pudiendo derivar en un perfil particular de síntomas psicológicos. En contraste, las agresiones sexuales no mediadas por sustancias (no-DFSA) abarcan un espectro más heterogéneo: desde tocamientos no deseados hasta agresiones con uso de fuerza o coacción, a menudo en contextos de victimización crónica o con antecedentes de abuso en la infancia, por lo que el rango de edad de las supervivientes puede ser más amplio. A pesar de sus peculiaridades y el reciente interés social que despiertan estos casos, los estudios disponibles sobre las consecuencias de la DFSA todavía son escasos.

Uno de los aspectos que la literatura científica ha documentado más ampliamente es el TEPT, como una de las secuelas más frecuentes y discapacitantes de la violencia sexual. Sin embargo, la evidencia disponible sobre el TEPT en supervivientes de DFSA es contradictoria, ya que algunos estudios la vinculan con un mayor riesgo de desarrollar el trastorno, mientras que otros sugieren un posible efecto atenuador. Cabe señalar que la mayoría de estas investigaciones han abordado el TEPT desde una perspectiva categórica, limitándose a establecer la presencia o ausencia del diagnóstico, lo que deja de lado la complejidad dimensional del fenómeno y dificulta captar la variabilidad de los síntomas y su intensidad. En particular, algunos estudios han puesto de manifiesto que las supervivientes de DFSA presentan perfiles fenomenológicos que, aunque comparten núcleos comunes con otras formas de violencia sexual, también muestran rasgos diferenciales en cuanto a la vivencia del trauma, la recuperación de recuerdos y la sintomatología asociada. Si bien el TEPT se caracteriza por la presencia de síntomas de reexperimentación, evitación, alteraciones cognitivas y del estado de ánimo, así como hiperactivación fisiológica, en el caso de las supervivientes de DFSA, la incapacidad para consentir o resistirse, la confusión y la fragmentación de los recuerdos de la agresión añaden una complejidad particular al procesamiento traumático. Este hecho plantea interrogantes relevantes sobre la manera en que se desarrolla la sintomatología postraumática en este subgrupo y sobre si los mecanismos de recuperación y afrontamiento difieren respecto a las supervivientes de no-DFSA.

Por ello, resulta fundamental estudiar a las supervivientes de DFSA como un grupo diferenciado y abordar el TEPT desde un enfoque transdiagnóstico y multidimensional que permita comprender la diversidad y la intensidad de los síntomas, así como su relación con las características específicas del trauma.

El TEPT, además, no solo constituye una consecuencia directa del trauma, sino que también desempeña un importante papel mediador en la aparición de dificultades en el funcionamiento sexual. La literatura ha evidenciado que la presencia de síntomas postraumáticos se asocia con disfunciones sexuales en distintos dominios, desde la excitación hasta el deseo o la satisfacción, siendo estas dificultades más frecuentes y persistentes en mujeres que han experimentado violencia sexual. En el caso de la DFSA, la interferencia del TEPT en la esfera sexual puede verse potenciada por la particularidad de la experiencia traumática: la ausencia de control sobre su propio cuerpo o sus acciones, la indefensión percibida y, en muchos casos, los recuerdos fragmentados o parciales del episodio. Así pues, resulta fundamental explorar hasta qué punto el TEPT actúa como un mecanismo central que explica la relación entre la agresión sufrida y la alteración del funcionamiento sexual posterior, lo que permitiría diseñar intervenciones más ajustadas a las necesidades clínicas de estas supervivientes.

Más allá del TEPT, se han descrito otras secuelas psicopatológicas asociadas a la violencia sexual, entre las que destacan la depresión, la ansiedad generalizada, el abuso de sustancias y los síntomas disociativos. La literatura sugiere que las supervivientes de DFSA podrían presentar una mayor vulnerabilidad a este espectro de dificultades, posiblemente debido a la interacción entre el impacto traumático y los efectos directos de las drogas utilizadas. Comparar, desde una mirada transdiagnóstica y multidimensional, los perfiles psicopatológicos entre supervivientes de DFSA y de no-DFSA constituye, por tanto, una necesidad científica para avanzar en la comprensión de los factores diferenciales que condicionan el pronóstico y la recuperación.

En este contexto, la desregulación emocional ha emergido como un constructo clave para explicar la persistencia y la gravedad de las secuelas de la violencia sexual sobre la salud mental. La dificultad para modular emociones intensas, la

tendencia a la evitación experiencial y la incapacidad para emplear estrategias adaptativas de regulación han sido señaladas como variables que median en la aparición y cronificación de trastornos mentales tras la agresión. En el caso concreto de las supervivientes de DFSA, la desregulación emocional podría verse agravada por la experiencia de descontrol y vulnerabilidad extrema, lo que intensifica la vivencia de inseguridad y amenaza en etapas posteriores. Explorar la relación entre desregulación emocional y salud mental en este grupo específico resulta, por tanto, imprescindible para identificar posibles dianas de intervención terapéutica.

Finalmente, en los últimos años, la investigación ha prestado creciente atención a los mecanismos cognitivos que subyacen a la psicopatología derivada de la violencia sexual, entre ellos los sesgos atencionales. El procesamiento atencional de estímulos emocionales puede proporcionarnos información sobre la vulnerabilidad de un individuo al TEPT y a otros trastornos emocionales. Estudios con metodologías objetivas y precisas como el registro de movimientos oculares (*eye-tracking*), han demostrado que las personas con historia de trauma tienden a mostrar patrones alterados de atención hacia estímulos amenazantes, lo que contribuye a mantener el estado de hipervigilancia y la dificultad para regular respuestas emocionales. Sin embargo, la evidencia en supervivientes de DFSA es escasa, lo que plantea una laguna de conocimiento particularmente relevante. Profundizar en cómo se manifiestan los sesgos atencionales en este subgrupo permitiría no solo entender mejor los procesos implicados en su psicopatología, sino también abrir vías para intervenciones basadas en la modificación de sesgos cognitivos.

En resumen, la mayor parte de investigaciones sobre la DFSA se han centrado tradicionalmente en estudiar su relación con el desarrollo del TEPT, evaluándolo de manera categórica, lo que deja de lado la complejidad dimensional de este fenómeno y, han arrojado resultados a menudo contradictorios. Asimismo, otros aspectos clave de la salud mental y física de las supervivientes, como la exploración de perfiles psicopatológicos más amplios, las dificultades en la regulación emocional o los problemas en el funcionamiento sexual, apenas han sido considerados. Finalmente, hasta la fecha no existen investigaciones que

analicen los mecanismos cognitivos subyacentes, como los sesgos atencionales hacia estímulos emocionales, que podrían contribuir a explicar la persistencia de los síntomas tras la agresión. Esta escasez de evidencia contrasta con la necesidad de un abordaje multidimensional y transdiagnóstico, que tenga en cuenta la naturaleza interpersonal del trauma y sus repercusiones, y que además estudie a las supervivientes de DFSA como un grupo diferenciado, identificando sus particularidades clínicas y cognitivas. Solo así será posible captar con mayor precisión los mecanismos psicológicos implicados y ofrecer respuestas clínicas y sociales ajustadas a sus necesidades específicas.

Objetivos:

En este contexto, el objetivo general de esta tesis es profundizar en el impacto de la DFSA en comparación con la no-DFSA, poniendo el foco en los perfiles psicológicos post-trauma, realizando un análisis exhaustivo con medidas estandarizadas como entrevistas y autoinformes de los síntomas de TEPT (evaluando cada clúster en número y gravedad), y abordando de manera transdiagnóstica un abanico más amplio de sintomatología psicopatológica, así como los posibles cambios en el funcionamiento sexual y las dificultades en la regulación emocional. Además, nos proponemos también examinar el procesamiento atencional hacia información emocional como un potencial mecanismo subyacente a las secuelas psicopatológicas y como una forma de registrar todos aquellos procesos que no son susceptibles de ser verbalizados. Con este enfoque, se busca dilucidar de qué modo las particularidades de la DFSA pueden configurar los perfiles psicológicos de las supervivientes e incidir en mecanismos cognitivo-afectivos implicados en la respuesta al trauma.

Nos planteamos los siguientes objetivos específicos:

i) Examinar las diferencias entre supervivientes de DFSA y no-DFSA en la manifestación de síntomas de TEPT y en el funcionamiento sexual (evaluando los niveles basales retrospectivamente y los cambios posteriores a la agresión), y determinar el posible papel predictivo de los síntomas y clústeres del TEPT sobre las dificultades en el funcionamiento sexual.

ii) Comparar las secuelas psicopatológicas transdiagnósticas y las dificultades en regulación emocional entre DFSA y no-DFSA, y evaluar si las dificultades de regulación emocional predicen dichas secuelas.

iii) Comparar los sesgos atencionales hacia estímulos emocionales que compiten con uno control en supervivientes de DFSA y no-DFSA mediante tecnología de seguimiento ocular, evaluando las distintas fases de la atención (orientación inicial, duración del primer pase y atención sostenida). También se examinará el papel de la gravedad de los síntomas de TEPT como posible moderador de los sesgos atencionales.

iv) Evaluar el procesamiento atencional en un contexto ecológicamente más válido mediante un paradigma de seguimiento ocular de visionado libre que presenta múltiples escenas emocionales simultáneamente (amenazante, triste, feliz y neutral), y determinar si las respuestas atencionales difieren según el tipo de AS y los grupos específicos de síntomas de TEPT.

De igual manera, las hipótesis específicas serían las siguientes:

i) Se espera que supervivientes de DFSA y no-DFSA presenten las mismas tasas de TEPT y disfunción sexual, pero con patrones de síntomas diferentes. Asimismo, se anticipa que ciertos clústeres de síntomas de TEPT (p. ej., reexperimentación, hiperactivación) predecirán dificultades específicas en la función sexual.

ii) Se hipotetiza que las supervivientes de no-DFSA reportarán secuelas psicopatológicas en general más graves y mayores dificultades en la regulación emocional en comparación con las de DFSA. Además, se espera que la desregulación emocional prediga la intensidad de estas secuelas, actuando como posible mecanismo mediador.

iii) Se anticipa que las supervivientes de DFSA mostrarán un menor sesgo atencional hacia estímulos amenazantes en comparación con las de no-DFSA, mientras que ambos grupos mantendrán mayor atención sostenida hacia estímulos amenazantes en general. Además, se prevé que la gravedad de los síntomas de TEPT modere la magnitud de estos sesgos.

iv) Se espera que las respuestas atencionales a múltiples escenas emocionales presentadas simultáneamente difieran según el tipo de AS, de

modo que las supervivientes de DFSA muestren patrones más cercanos a los controles. Además, se anticipa que los clústeres específicos de síntomas de TEPT se asociarán con sesgos atencionales particulares hacia amenazas o emociones negativas.

Metodología:

Participantes:

La muestra se reclutó entre las pacientes de la Fundación CAVAS, un centro público de salud mental especializado en la asistencia a supervivientes de violencia sexual. Tras revisar 400 expedientes clínicos, se seleccionaron 133 casos de mujeres que habían sufrido una AS ocurrida en los últimos 12 meses. Se aplicaron unos criterios de selección de la muestra muy estrictos con el propósito de aislar los efectos del tipo de agresión, evitando la influencia de factores de confusión habituales en la literatura previa. Los criterios de exclusión fueron los siguientes: i) ser menor de 18 años, ii) tener historia de abuso sexual en la infancia o episodios de AS previos al episodio actual, iii) exposición a otros eventos traumáticos de naturaleza no sexual, y iv) diagnósticos de salud mental previos al momento de la agresión. Con ello se garantizó que los efectos observados pudieran atribuirse al trauma sexual reciente. Para el grupo control, se aplicaron los mismos criterios de exclusión, además de la condición de no haber sufrido ningún episodio de violencia sexual. La muestra total estuvo compuesta por 74 mujeres. Las 39 mujeres supervivientes de AS, se dividieron entre el grupo DFSA (n=19), compuesto por mujeres que habían estado incapacitadas para consentir debido a la ingesta (voluntaria o no) de alcohol u otras sustancias en el momento del asalto, y el grupo no-DFSA (n=20) compuesto mujeres agredidas sin mediación de sustancias, con episodios caracterizados en su mayoría por coacción física o psicológica. El grupo control (n=35) fue reclutado a través de anuncios a la comunidad y era comparable en variables sociodemográficas con los grupos de estudio (edad, nivel de estudios, nacionalidad).

Materiales:

La tesis se estructuró en cuatro estudios empíricos complementarios en los que se emplearon tanto instrumentos clínicos y psicométricos como paradigmas experimentales basados en *eye-tracking*. Para una evaluación profunda y dimensional del TEPT se administró la entrevista clínica semiestructurada CAPS-5 (Clinician-Administered PTSD Scale for DSM-5), que permitió determinar tanto el diagnóstico como el número y la gravedad de los síntomas en cada clúster. En cuanto a los instrumentos de autoinforme, el CSFQ (Changes in Sexual Functioning Questionnaire) se administró en sus dos formas, tanto para registrar de manera retrospectiva el nivel de funcionamiento sexual basal (previo a la agresión) como el percibido en el momento actual (posterior a la agresión), analizando dimensiones como deseo, excitación, placer, orgasmo y satisfacción global. La SCL-90-R (Symptom Checklist-90 Revised) se aplicó para valorar la psicopatología transdiagnóstica a través de nueve dimensiones clínicas (somatizaciones, obsesiones-compulsiones, sensibilidad interpersonal, depresión, ansiedad, hostilidad, ansiedad fóbica, ideación paranoide y psicoticismo), mientras que el DERS (Difficulties in Emotion Regulation Scale) permitió explorar las dificultades en la regulación emocional mediante subescalas específicas como falta de control emocional, estrategias limitadas, rechazo de emociones o falta de claridad a la hora de identificar las propias emociones. Por último, para estudiar cómo las supervivientes procesan la información emocional de su entorno, se incluyeron dos tareas informatizadas de procesamiento atencional en condiciones de visionado libre con el aparato de registro de movimientos oculares Tobii Pro Fusion Eye Tracker a 250 Hz. En la primera tarea se presentaban durante 3 segundos parejas de imágenes, compuestas por una imagen con contenido socio-emocional que podía ser amenazante, triste y/o neutra, junto con una imagen de control sin contenido socio-emocional. Se registraban los movimientos oculares en las distintas fases atencionales como la orientación inicial, el compromiso atencional (o *engagement*) y la atención sostenida. En la segunda tarea se presentaban simultáneamente durante 20 segundos cuatro imágenes con contenido socio-emocional, que mostraban escenas de amenaza, tristeza, felicidad y contenido neutro. Esta mayor complejidad de la tarea permitía evaluar las fases y los

patrones atencionales en un contexto de mayor validez ecológica, con estímulos emocionales compitiendo de manera más realista.

Procedimiento:

Las participantes fueron evaluadas de manera individual en una única sesión presencial de 90 minutos en la Fundación, donde previamente habían recibido apoyo. Tras firmar el consentimiento informado y realizar una entrevista sociodemográfica semiestructurada, completaron las tareas de *eye-tracking* en una sala insonorizada y con baja iluminación, sentados en una silla regulable en altura. El procedimiento incluyó calibración y validación del aparato hasta alcanzar un error aceptable ($<1.5^\circ$), tras lo cual se les indicó observar libremente las imágenes “como si miraran un álbum de fotos”, mientras el experimentador supervisaba en tiempo real. Posteriormente, los participantes completaron las pruebas psicométricas y la entrevista clínica administrada por un psicólogo entrenado. Este orden se aplicó de forma sistemática para evitar que el impacto emocional de los cuestionarios o la entrevista afectara al rendimiento en las tareas de *eye-tracking*.

Resultados:

Los resultados revelaron patrones similares y otros diferenciados en distintos aspectos de los cuatro estudios.

En primer lugar, aunque ambos grupos de supervivientes de DFSA y no-DFSA cumplían criterios diagnósticos de TEPT en tasas similares, las supervivientes de DFSA presentaron consistentemente menor número y gravedad en determinados clústeres, específicamente en reexperimentación, malestar y disociación, así como menor gravedad de síntomas de evitación. A pesar de estas diferencias en la manifestación de los síntomas de TEPT, ambos grupos mostraron un deterioro comparable de la función sexual en todas sus dimensiones evaluadas, revelándose como un área inherentemente afectada tras una AS, independientemente de la presencia de sustancias en el momento de la agresión. Además, se halló que la gravedad de algunos síntomas de TEPT—particularmente los relacionados con cognición, estado de ánimo e

hiperactivación, que se manifestaron de manera equiparable en ambos grupos—era un predictor significativo de este deterioro sexual, resaltando la importancia de estudiar estos fenómenos de manera dimensional.

En segundo lugar, nuestros resultados también respaldan la necesidad de un abordaje transdiagnóstico, más allá del estudio de TEPT como consecuencia principal tras una AS. En este sentido, ambos grupos de supervivientes presentaron mayor sintomatología psicopatológica que los controles en todas las áreas; sin embargo, las supervivientes de no-DFSA mostraron niveles más altos de ansiedad y psicoticismo que las de DFSA. En cuanto a la regulación emocional, las supervivientes de no-DFSA mostraron dificultades en todos los dominios en comparación con los controles, mientras que las supervivientes de DFSA únicamente presentaron mayor dificultad en la no aceptación de la angustia emocional. Las dificultades en la regulación emocional, especialmente la no aceptación de la angustia y la falta de control emocional, se identificaron como predictores clave de ansiedad y psicoticismo en las supervivientes.

En cuanto a la primera tarea de seguimiento ocular con parejas de imágenes (emocional vs control), las supervivientes de DFSA mostraron mayor compromiso atencional (i.e., duración del primer pase) y mayor atención sostenida (i.e., porcentaje de duración total y de fijaciones totales) hacia escenas amenazantes, seguidas por las escenas felices, prestando comparativamente menos atención a las neutras. Por el contrario, las supervivientes de no-DFSA no evidenciaron sesgos atencionales según la valencia emocional, mientras que los controles, aunque presentaron una mayor duración del primer pase hacia las imágenes amenazantes y felices, el porcentaje de duración total y fijaciones totales fue mayor en escenas felices. Los análisis correlacionales exploratorios indicaron que una mayor gravedad de síntomas TEPT de evitación se asociaba con menor duración total de fijaciones en estímulos emocionales, mientras que mayores niveles de disociación se relacionaban con un aumento en la frecuencia de fijaciones sobre estímulos neutros en las supervivientes de AS.

Finalmente, en la tarea de seguimiento ocular donde los cuatro estímulos emocionales se presentan simultáneamente, todos los participantes orientaron inicialmente su atención (i.e., primera fijación) hacia escenas felices y fijaron los

estímulos emocionales más rápido (i.e., latencia de la primera fijación) que los neutros, mostrando además mayor compromiso atencional (i.e., duración de las fijaciones de primer pase) en los estímulos emocionales. Las diferencias entre grupos emergieron en etapas posteriores, con las supervivientes de DFSA mostrando mayor atención sostenida (i.e., porcentaje de duración total y fijaciones totales) hacia escenas amenazantes y menor hacia escenas felices en comparación con no-DFSA y controles. Los análisis correlacionales indicaron que una mayor gravedad de evitación predecía menor atención sostenida a estímulos amenazantes y mayor atención a los felices, mientras que mayores niveles de disociación se asociaban con mayor atención sostenida a escenas neutras y menor número total de fijaciones en escenas amenazantes en las supervivientes de AS.

Discusión:

La AS constituye una de las experiencias más traumáticas y con mayor impacto sobre la salud mental, afectando a múltiples áreas de la vida de las supervivientes. Sin embargo, la investigación ha tendido a centrarse de manera prioritaria en el TEPT como consecuencia principal, abordado desde un enfoque categórico que clasifica a las participantes según cumplan o no los criterios diagnósticos. A pesar de que este enfoque resulta útil para estimar la prevalencia, presenta limitaciones al ocultar la heterogeneidad sintomática y la especificidad de los perfiles clínicos asociados a diferentes tipos de SA. Precisamente, los hallazgos de esta tesis apoyan la necesidad de un cambio de paradigma hacia un modelo dimensional y transdiagnóstico, que permita explorar no solo la presencia de síntomas, sino también la gravedad, frecuencia y combinación, así como su interrelación con otras áreas del funcionamiento psicológico y social. Además, junto con las medidas de autoinforme, imprescindibles para captar la diversidad de la sintomatología, es necesario profundizar también en los mecanismos emocionales y cognitivos que subyacen a estas manifestaciones, a través de metodologías objetivas y precisas, como el *eye-tracking*, que permiten la evaluación de procesos atencionales y afectivos que resultan inaccesibles a la verbalización.

Desde esta perspectiva, se observó que, aunque las tasas diagnósticas de TEPT fueron comparables entre supervivientes de DFSA y no-DFSA, los perfiles sintomáticos diferían significativamente. Las supervivientes de DFSA mostraron menor número e intensidad de síntomas de intrusión, disociación y malestar subjetivo, y menor gravedad en evitación en comparación con las no-DFSA. Estas diferencias pueden explicarse a partir de las características fenomenológicas de la experiencia traumática. En los casos de DFSA, las sustancias consumidas implican una incapacidad para consentir y/o resistirse a la agresión y sensación de confusión o incertidumbre entorno al episodio; además, en algunos casos, estas sustancias generan lagunas mnésicas, pérdida de parcial o total de consciencia y una narrativa fragmentada del evento, lo que podría atenuar ciertos síntomas relacionados con el recuerdo intrusivo y la evitación de estímulos internos o externos relacionados con el trauma. En cambio, en los casos de no-DFSA, la vivencia en plena consciencia y la experiencia coherente de la agresión podrían intensificar la codificación emocional del suceso, potenciando la intrusión y, como contrapartida, un mayor uso de la evitación y la disociación como mecanismos defensivos. Estos hallazgos refuerzan la concepción del TEPT como un constructo multidimensional cuya expresión varía en función de la naturaleza del trauma y de su procesamiento.

Más allá del TEPT, este trabajo pone de relieve la necesidad de ampliar el foco hacia síntomas transdiagnósticos por la naturaleza interpersonal del trauma. El análisis más amplio de la psicopatología presente tras la agresión reveló que ambos grupos de supervivientes reportaban una sintomatología más elevada que los controles en múltiples dominios (somatización, depresión, hostilidad, sensibilidad interpersonal, fobia, ideación paranoide), reflejando la amplitud del impacto psicopatológico. Las diferencias más marcadas entre grupos clínicos se observaron en ansiedad y psicoticismo, significativamente más elevados en las supervivientes de no-DFSA. Estos hallazgos sugieren que, aunque el TEPT sea altamente prevalente entre las supervivientes de AS, otras manifestaciones clínicas también pueden tener una relevancia funcional para la adaptación de las supervivientes, independientemente de la presencia de sustancias durante la agresión.

La desregulación emocional constituye otra dimensión clave para comprender estas consecuencias transdiagnósticas. En el caso de esta tesis, los resultados mostraron que las supervivientes de no-DFSA presentaban déficits generalizados en múltiples dominios regulatorios (confusión, falta de atención hacia las propias emociones, falta de control emocional, interferencia y no aceptación del malestar), mientras que las de DFSA mostraron un perfil más restringido, centrado en la intolerancia al malestar emocional. Una vez más, esta diferencia podría estar relacionada con el modo en que se procesa la experiencia traumática: la consciencia plena durante la agresión en la no-DFSA puede desbordar los sistemas regulatorios, mientras que en la DFSA la incertidumbre, la confusión y la posible fragmentación de la experiencia impide elaborar narrativas coherentes que integren la emoción, fomentando la evitación del malestar. La desregulación, especialmente enfocada en la no aceptación del malestar y la falta de control emocional, se asoció a mayores niveles de ansiedad y psicoticismo, lo que refuerza su papel como un mecanismo transdiagnóstico que vincula la SA con múltiples trayectorias psicopatológicas.

La sexualidad tras la agresión se erige como un área particularmente vulnerable en este contexto. Aunque en otros dominios las diferencias entre grupos apuntaban a una mayor afectación en la no-DFSA, nuestros resultados muestran que el funcionamiento sexual se ve comprometido de forma similar en ambos casos. Así, tanto en DFSA como en no-DFSA se evidenciaron alteraciones significativas en deseo, placer, excitación y orgasmo. Estos resultados confirman el impacto directo y específico de la violencia sexual sobre el funcionamiento sexual, independientemente de la presencia de sustancias durante la agresión. Sin embargo, los mecanismos que subyacen a estas dificultades podrían diferir. Por un lado, en las supervivientes de DFSA, la incapacidad para consentir junto con la sensación de pérdida de control sobre el propio cuerpo y sus acciones y las posibles lagunas mnésicas como consecuencia de las sustancias, así como la atribución de culpa, se podrían vincular con sentimientos de vulnerabilidad y desconfianza hacia la propia sexualidad. Por otra parte, en las supervivientes de no-DFSA, las dificultades podrían derivar de la asociación directa entre sexualidad y peligro, de modo que la excitación puede evocar recuerdos de coerción y activar respuestas de culpa y rechazo hacia el propio deseo. A pesar

de estas diferencias, en ambos grupos los síntomas de TEPT relacionados con la hiperactivación, así como las cogniciones y el estado de ánimo negativos, predijeron la disfunción sexual, lo que mecanismos comunes, junto con procesos específicos, contribuyen a explicar la disfunción sexual tras la agresión.

En conjunto, estos resultados ponen de relieve que las consecuencias de la SA no pueden reducirse a la presencia o ausencia de un diagnóstico de TEPT. Los hallazgos destacan la necesidad de diferenciar entre DFSA y no-DFSA, dado que las trayectorias psicopatológicas difieren en su expresión sintomática, en los mecanismos regulatorios implicados y en su impacto funcional. Mientras que ambos grupos presentaron tasas similares de TEPT y disfunción sexual, las supervivientes de no-DFSA mostraron una desregulación emocional más generalizada y perfiles psicopatológicos más amplios, especialmente con mayor ansiedad y psicoticismo. Desde un punto de vista teórico, estos resultados refuerzan la relevancia de un marco dimensional y transdiagnóstico, que integre distintos dominios sintomáticos y aclare sus interacciones en contextos de trauma interpersonal.

Los resultados obtenidos a través de medidas de autoinforme son esenciales para comprender las consecuencias psicopatológicas, emocionales e interpersonales de la SA; sin embargo, requieren ser complementados con el estudio de procesos cognitivos básicos implicados en el procesamiento de la información emocional. Estos procesos capturan dimensiones del impacto del trauma que a menudo no pueden ser verbalizadas, algo especialmente relevante en supervivientes que han experimentado una fuerte sensación de vulnerabilidad, pérdida de control de la situación y de sus propias acciones y/o que presentan narrativas incompletas de la experiencia, como las de DFSA. En este sentido, el *eye-tracking* constituye una herramienta objetiva y precisa para evaluar la dinámica atencional, aportando información complementaria a los autoinformes. Así pues, tras registrar los movimientos oculares de las participantes durante la presentación de imágenes emocional en las dos tareas administradas, nuestros hallazgos muestran un patrón atencional diferencial: las supervivientes de DFSA presentan una atención sostenida hacia estímulos amenazantes y una menor atención hacia los positivos, mientras que las de no-

DFSA exhiben una ausencia de modulación emocional, sin sesgos claros hacia estímulos amenazantes o agradables. Estas diferencias sugieren que los mecanismos atencionales subyacentes son específicos del tipo de agresión y aportan información complementaria a los autoinformes. La fijación en la amenaza en las supervivientes de DFSA refleja un sistema de alerta vinculado a la incertidumbre y a la memoria fragmentada, que mantiene a la persona en un estado de vigilancia constante, lo que podría dificultar la regulación emocional y la satisfacción sexual. En cambio, el distanciamiento emocional observado en no-DFSA podría reflejar estrategias de evitación y disociación como forma de afrontar la experiencia vívida del trauma, con consecuencias tanto para la regulación emocional como para las interacciones sexuales. Además, los análisis exploratorios con los síntomas del TEPT mostraron que la gravedad de los síntomas de evitación se asoció con una menor atención a los estímulos amenazantes, mientras que la sintomatología disociativa se vinculó con una mayor atención a los estímulos neutros. Cabe destacar que estos síntomas resultaron ser más graves en las supervivientes de no-DFSA que en las de DFSA. Este patrón evidencia cómo distintas dimensiones de la psicopatología postraumática se configuran de manera diferencial a través de los procesos atencionales.

Limitaciones y fortalezas:

El estudio presenta algunas limitaciones, entre ellas el tamaño reducido y la composición sociodemográfica de la muestra (exclusivamente mujeres y en su mayoría de origen europeo), lo que puede limitar la generalización de los hallazgos. Asimismo, no fue posible diferenciar entre ingesta voluntaria e involuntaria de sustancias en los casos de DFSA, y el uso de medidas de autoinforme pudo introducir sesgos de memoria o deseabilidad social. En el caso del CAPS-5, aunque aporta fiabilidad diagnóstica, puede no reflejar la complejidad de todas las presentaciones traumáticas. En relación con el eye-tracking, la elección de estímulos emocionales no sexuales evitó malestar, pero pudo limitar la evocación de reacciones específicas al trauma.

Pese a ello, el trabajo presenta notables fortalezas: la aplicación de estrictos criterios de inclusión permitió aislar los efectos de la DFSA en agresiones

recientes, el uso de una muestra clínica bien definida aportó relevancia ecológica, y la incorporación del eye-tracking ofreció un análisis objetivo y detallado de los procesos atencionales. Además, la evaluación dimensional de los síntomas y el estudio de un abanico amplio de variables psicológicas proporcionan una visión más completa y matizada de las consecuencias del AS, destacando las diferencias y similitudes entre DFSA y no-DFSA.

Conclusiones

Como conclusión, los resultados de esta tesis demuestran que las consecuencias psicológicas de la AS no pueden comprenderse plenamente a través de enfoques diagnósticos categoriales y centrados únicamente en el TEPT. Si bien es cierto que tanto el TEPT como las alteraciones del funcionamiento sexual constituyen resultados comunes en todas las supervivientes, los hallazgos evidencian una marcada heterogeneidad en los perfiles sintomáticos, lo que subraya la necesidad de adoptar una perspectiva dimensional y transdiagnóstica. El análisis comparativo entre supervivientes de DFSA respecto a las no-DFSA revela que el tipo de agresión es un factor crítico en la configuración de las trayectorias psicopatológicas y de los patrones atencionales hacia información emocional. Las supervivientes de no-DFSA presentaron mayores dificultades en la regulación emocional y perfiles psicopatológicos más amplios, con niveles superiores de ansiedad y psicoticismo. En contraste, las supervivientes de DFSA se caracterizaron por un sesgo de atención sostenida hacia estímulos amenazantes, reflejo de un sistema de alerta asociado a la falta de agencia o control por la incapacidad para consentir vinculada a la sustancia. Las no-DFSA, por su parte, se caracterizaron por una falta de modulación atencional ante la información emocional, posiblemente como parte de un proceso de desvinculación afectiva derivado de la vivencia más consciente y coherente del trauma.

Una contribución clave de este trabajo es la integración de medidas de autoinforme con la metodología de eye-tracking, que aporta evidencia objetiva precisa sobre dinámicas atencionales inaccesibles a la verbalización. Esta aproximación multimodal permite identificar mecanismos cognitivo-afectivos específicos, como la fijación hacia la amenaza en DFSA o la desvinculación

emocional en no-DFSA, que interactúan con dimensiones sintomáticas como la evitación o la disociación.

Implicaciones clínicas:

Desde el punto de vista clínico, estos hallazgos apoyan la necesidad de diseñar intervenciones adaptadas para las supervivientes de AS, que contemplen tanto los mecanismos comunes (p.ej., abordar las dificultades sexuales y mejorar las estrategias generales de regulación emocional) como los específicos de cada tipo de agresión. Así pues, en el caso de las supervivientes de DFSA, las intervenciones deberían orientarse a la reconstrucción narrativa, la reducción de la hipervigilancia y el fomento de la autoaceptación emocional y la autocompasión, especialmente teniendo en cuenta los sentimientos de culpa asociados al consumo de sustancias o a la pérdida de control que pueden surgir en estos casos. En los casos de supervivientes de no-DFSA, las prioridades del trabajo terapéutico deberían ser la reducción de la intensidad o del malestar generado por los recuerdos intrusivos, la mejora de la regulación emocional y la reconexión con experiencias afectivas, como medida para contrarrestar la desvinculación emocional.

Implicaciones para la investigación:

Los hallazgos de esta tesis también tienen importantes repercusiones para el ámbito de la investigación. En primer lugar, los resultados resaltan la necesidad de marcos multimodales orientados a procesos, que integren dimensiones sintomáticas, regulación emocional y mecanismos atencionales. En este sentido, metodologías objetivas y precisas como el eye-tracking ofrecen un acceso privilegiado a procesos que no pueden ser plenamente evaluados mediante autoinforme, lo cual es especialmente relevante en supervivientes cuyas narrativas del trauma son fragmentadas o incompletas, y pueden presentar mayores dificultades a la hora de verbalizar las consecuencias postraumáticas, como ocurre en los casos de DFSA.

Por otra parte, las futuras investigaciones deberían ampliar la diversidad muestral e incorporar variables como el contexto cultural, el género o la distinción

entre consumo voluntario e involuntario de sustancias, con el fin de aumentar la generalización de los resultados y profundizar en cómo los factores contextuales e individuales configuran las trayectorias postraumáticas.

En términos globales, los hallazgos enfatizan la necesidad de considerar a las supervivientes de DFSA como un grupo diferenciado, cuyas características fenomenológicas determinan consecuencias psicopatológicas, emocionales y cognitivas específicas. Concebir la DFSA únicamente como una subcategoría de la AS supone correr el riesgo de invisibilizar dichas diferencias y, con ello, desatender necesidades clínicas que no encajan en los marcos tradicionales centrados en el TEPT.

Conclusión final

En conjunto, los resultados de esta investigación evidencian que las supervivientes de DFSA presentan patrones sintomáticos transdiagnósticos específicos, dificultades regulatorias distintivas y sesgos atencionales que no pueden explicarse únicamente a partir de modelos desarrollados para otros tipos de AS. La combinación de evaluaciones dimensionales de síntomas con medidas objetivas del procesamiento atencional permite ofrecer un retrato más preciso y clínicamente relevante de las consecuencias de la DFSA. Al hacerlo, esta tesis subraya el valor de diferenciar entre DFSA y no-DFSA tanto en la investigación como en la práctica clínica, sentando las bases para modelos teóricos más refinados y para intervenciones terapéuticas más eficaces e individualizadas. En última instancia, se concluye que la DFSA no puede entenderse como una simple variante de la AS, sino que debe ser estudiada como un fenómeno con entidad propia, con trayectorias, mecanismos e implicaciones clínicas específicas. Reconocer esta especificidad no constituye únicamente un avance académico, sino una necesidad clínica fundamental para desarrollar modelos e intervenciones que reflejen la complejidad real de las experiencias de las supervivientes.

Posttraumatic Characterization of Survivors of Drug-Facilitated Sexual Assault: Psychopathological Sequelae and Emotional Processing

1. Introduction

1.1. Problem statement

Sexual assault (SA)—defined as unwanted, nonconsensual sexual contact achieved through force, incapacitation, and/or coercion—constitutes one of the most prevalent and severe forms of interpersonal trauma. According to estimates from the United Nations Children’s Fund (UNICEF, 2025), approximately 650 million women and girls worldwide have been subjected to sexual violence during childhood. Complementing these data, the World Health Organization (WHO, 2021) reports that around 34% of women aged 15 and older have experienced some form of sexual violence in their lifetime. Accordingly, SA is increasingly recognized as a critical global public health issue. Beyond its immediate physical consequences, SA has been consistently linked to a wide spectrum of psychological sequelae, including post-traumatic stress disorder (PTSD), anxiety, depression, substance use, obsessive-compulsive symptoms, disordered eating behaviors, and sexual dysfunctions such as reduced desire or difficulties with arousal and orgasm (Campbell et al., 2009; Dworkin et al., 2017; Högbeck & Möller, 2022; Weaver, 2009). This heightened vulnerability to psychopathology may be partially explained by the interpersonal nature of SA (Messman-Moore et al., 2013), which profoundly disrupts processes of emotional regulation—defined as the ability to understand, accept, and modulate emotional responses (Gratz & Roemer, 2004; Ullman et al., 2014).

However, the consequences of SA are not homogeneous. Psychological responses can vary substantially depending on the circumstances surrounding the assault, which underscores the importance of examining risk-contextual features when investigating post-assault adjustment (Campbell et al., 2009). In this regard, drug-facilitated sexual assault (DFSA) has garnered growing

attention due to its increasing prevalence and distinctive phenomenological characteristics. DFSA refers to SA that occurs when the survivor is incapacitated or unable to provide consent as a result of voluntary or involuntary substance use (Gauntlett-Gilbert et al., 2004). Although frequently perpetrated by an acquaintance of the survivor, DFSA typically occurs in nightlife or social contexts, is often characterized by a single incident involving penetrative assault, and disproportionately affects women around the age of 30 (Recalde-Esnoz et al., 2024).

Crucially, the cognitive and emotional aftermath of DFSA may differ markedly from that observed in other forms of SA. The substance-induced incapacitation often leads to fragmented, impaired, or absent trauma memories, accompanied by disruptions in perceptual awareness, a perceived loss of control over one's body, and enduring uncertainty regarding the events that transpired (Fields et al., 2022; Gauntlett-Gilbert et al., 2004; Saint-Martin et al., 2006). These disruptions challenge the survivor's capacity to construct a coherent trauma narrative, potentially interfering with the encoding, retrieval, and integration of the traumatic experience, and may ultimately shape distinct posttraumatic symptom profiles.

In contrast, non-DFSA encompasses a broader and more heterogeneous spectrum of experiences, ranging from unwanted touching to assaults involving physical force or coercion. These incidents may occur either as isolated events or within patterns of chronic or repeated victimization, frequently with a history of childhood sexual abuse (Testa et al., 2003). Non-DFSA survivors also often report known perpetrators, but the diversity in the nature and timing of the assaults introduces additional variability in survivors' demographic profiles and psychological adjustment (Blake et al., 2014).

Despite the distinctive features and increasing prevalence of DFSA, its psychological impact remains underexplored (Littleton et al., 2009). Specifically, several critical areas warrant further exploration. First, little is known about the specific features of PTSD following DFSA, including the severity and type of symptoms, as well as their impact on sexual functioning. This gap is especially relevant given that the absence of an integrated experience of the assault may hinder the processing of the traumatic experience, thereby exacerbating fragmentation in both psychological and sexual domains. Second, the impact of

DFSA on broader transdiagnostic psychopathology has been overlooked. While classical PTSD symptoms may not always be present, DFSA survivors frequently report other forms of distress that appear to stem from the profound loss of control intrinsic to this form of assault. Understanding these non-canonical trajectories is essential, as they may underlie significant impairment even in the absence of a full PTSD syndrome. Third, given its interpersonal nature, DFSA likely has a particularly disruptive effect on emotion regulation capacities. Dysregulation in this domain has been consistently linked to trauma exposure, yet in DFSA, it may manifest with distinctive intensity and persistence. Importantly, this disruption can be captured not only through self-report instruments but also through experimental paradigms assessing the processing of emotional information—such as eye-tracking measures of attentional allocation. In this regard, examining attentional biases toward emotional stimuli represents a promising avenue, as such biases are closely tied to emotion regulation and to the maintenance of trauma-related difficulties (Klanecky Earl et al., 2020; Latack et al., 2017). Together, these gaps underscore the urgent need for integrative research approaches capable of illuminating the cognitive–affective mechanisms through which DFSA contributes to complex psychopathological outcomes.

1.2. PTSD symptoms in DFSA and non-DFSA survivors

Post-traumatic stress disorder (PTSD) is one of the most prevalent psychological consequences of SA. Studies estimate that approximately 36% of SA survivors meet criteria for PTSD, and symptoms can persist over time, particularly among those who experience repeated victimization (Dworkin, 2020). In this regard, assaults occurring in close temporal proximity are especially salient for understanding the emergence and maintenance of PTSD symptoms (Ullman, 2016). Beyond timing, the heterogeneity of assault-related factors plays a central role in the severity and chronicity of PTSD, underscoring the importance of understanding these variables to tailor effective interventions and improve clinical outcomes (Dworkin et al., 2017).

The ecological model proposed by Campbell et al. (2009) provides a useful framework, highlighting how individual and contextual variables interact to exacerbate or buffer against posttraumatic reactions. Among individual-level

factors, a history of prior victimization and the presence of pre-existing mental health conditions have been consistently associated with greater PTSD severity (Tiihonen Möller et al., 2014). In turn, contextual aspects such as perceived life threat during the assault, physical injury, and the nature of the relationship with the perpetrator also contribute significantly to post-assault psychopathology.

Within this framework, the role of substance use during the assault has received comparatively limited attention and remains the subject of inconclusive findings. While some studies have identified DFSA as a risk factor for PTSD (Jaffe et al., 2017; McConnell et al., 2020), others have described it as a potential protective factor (Peter-Hagene & Ullman, 2018; Zinzow et al., 2010), and still others have found no significant differences in PTSD outcomes between DFSA and non-DFSA survivors (Fields et al., 2022; Kilpatrick et al., 2007; Littleton et al., 2009). Among the studies supporting DFSA as a risk factor, Jaffe et al. (2017) found that, within a community sample of women, those who had experienced DFSA reported significantly higher PTSD symptom severity. Similarly, McConnell et al. (2020) observed comparable results in DFSA survivors who had endured forcible assaults. Conversely, Peter-Hagene and Ullman (2018), in a study with a women's community sample, reported that participants who had consumed alcohol before the assault exhibited lower PTSD symptom severity than those who had not. In the same vein, Zinzow et al. (2010) found that PTSD risk was higher in non-DFSA cases compared to DFSA when substance ingestion was voluntary, though this effect was not observed in cases of involuntary ingestion. Critically, when specific symptom PTSD clusters were assessed, additional differences between DFSA and non-DSFA survivors can emerge. For instance, Fields et al. (2022), in a retrospective chart review conducted in an outpatient trauma center, found that although global PTSD levels were comparable across groups, DFSA survivors reported fewer dissociative symptoms, including reduced depersonalization, compared to non-DFSA survivors.

Taken together, these inconsistent findings may be attributed to methodological variability across studies, including differences in sample type (e.g., clinical vs. community), age range, and the degree to which confounding variables—such as childhood sexual abuse, non-sexual trauma, sexual revictimization, or pre-existing mental health conditions—are adequately controlled. Consequently, there is a pressing need for research that

systematically disentangles these factors in order to delineate the specific PTSD symptom patterns most characteristic of DFSA, as well as the mechanisms that underpin them.

1.3. Post-assault SF in DFSA and non-DFSA survivors

Sexual functioning (SF) difficulties are also a well-documented consequence of SA. Compared to women without a history of SA, survivors consistently report lower sexual desire, greater difficulties with arousal and orgasm, and reduced sexual satisfaction (Ensink et al., 2000; Kelley & Gidycz, 2019; Turchik & Hassija, 2014). While these findings may suggest that trauma in general disrupts SF, further evidence indicates that sexual trauma in particular has a disproportionately strong impact. For instance, SF problems are four times more likely following sexual trauma than after non-sexual trauma (Haase et al., 2009). In studies with female veterans, sexual trauma—compared to non-sexual trauma—was more strongly associated with decreased sexual satisfaction (DiMauro et al., 2018) and with a greater likelihood of meeting diagnostic criteria for sexual dysfunction, including sexual desire and arousal disorders (Turchik, 2012).

Importantly, SF difficulties can persist for many years after the assault (Becker et al., 1984; Ensink et al., 2000; Nadelson et al., 1982; Norris & Feldman-Summers, 1981), and tend to be more severe in survivors who have experienced multiple assaults (Becker et al., 1984; Öberg et al., 2002). This persistence suggests that contextual factors surrounding the assault play a critical role in shaping psychological outcomes, and highlights the need to pay particular attention to DFSA. Unlike other forms of SA, where survivors often have a vivid experience of trauma, DFSA introduces additional underlying mechanisms closely associated with SF difficulties, such as the feeling of guilt for putting oneself in a higher-risk situation, heightened confusion, and a profound perception of loss of control (Peter-Hagene & Ullman, 2018). This perceived powerlessness may intensify distress within intimate relationships, reinforcing negative cognitive appraisals of one's body and sexuality (Schalk et al., 2023). As a result, while DFSA may lead to SF difficulties similar to those observed in non-DFSA survivors, the underlying cognitive and emotional mechanisms may

differ. Therefore, investigating sexuality in DFSA survivors is essential for understanding the broader psychological impact of this specific trauma, developing targeted interventions, and improving therapeutic outcomes.

1.4. Mediating role of PTSD in Sexual Functioning

Several studies have examined the potential mediating role of PTSD in the relationship between SA and SF difficulties (Letourneau et al., 1996; O'Driscoll & Flanagan, 2016). Högbeck and Möller (2022), for example, found that impaired SF was more likely in a clinical sample of rape survivors with PTSD, even after controlling for preexisting psychiatric morbidity and previous SA. However, PTSD was assessed categorically (PTSD vs. non-PTSD), despite growing evidence that specific symptom clusters may differentially affect sexuality. Indeed, more nuanced findings have emerged from studies analyzing PTSD symptomatology dimensionally. In a sample of female veterans, Schnurr et al. (2009) identified hyperarousal symptoms as particularly associated with lower sexual satisfaction. Similarly, in a non-clinical sample of college women who reported SA, Kelley and Gidycz (2019) found that higher levels of reexperiencing symptoms were related to greater difficulties achieving orgasm. Taken together, these results underscore a notable and complex association between SA, PTSD, and SF, supporting the importance of examining the interplay between trauma-related symptom dimensions and sexual health in survivors. Yet, despite growing evidence on the impact of SA on SF and the mediating role of PTSD, the specific consequences of DFSA remain largely unexplored.

1.5. Other mental disorders in DFSA and non-DFSA survivors

Beyond PTSD and SF difficulties, SA is associated with a wide range of psychological sequelae. It has been identified as the form of trauma with the most significant impact on mental health when compared to other traumatic events (Lance P. Kelley et al., 2009). A qualitative review reported that 17–65% of individuals with a history of SA develop PTSD, 13–51% meet criteria for depression, 12–40% experience anxiety symptoms, 13–49% develop alcohol use disorders, 28–61% develop drug use disorders, 23–44% report suicidal ideation, and 2–19% have attempted suicide (Campbell et al., 2009). A meta-analysis by

Dworkin et al. (2017) confirmed that SA survivors exhibit significantly elevated levels of psychopathological symptoms compared to individuals without a history of SA. Specifically, the highest levels were observed for obsessive-compulsive symptoms and trauma- and stressor-related disorders, followed by moderate increases in anxiety, depression, and bipolar symptoms, and smaller but significant elevations in disordered eating and substance use.

Importantly, this broad spectrum of symptomatology appears to be influenced by contextual characteristics surrounding the assault (Campbell et al., 2009), such as whether substances were involved during the event. However, the psychological consequences of DFSA remain largely underexplored, and the available findings are inconclusive. For example, evidence regarding depressive symptoms is mixed: while some studies report no differences between non-DFSA and DFSA survivors (Fields et al., 2022; Kilpatrick et al., 2007; Littleton et al., 2009), others have found that DFSA may be associated with lower depression severity (Zinzow et al., 2010). While most existing studies have focused primarily on PTSD and depression (Dworkin et al., 2017), the distinct features of DFSA may contribute to a different psychological profile that includes other forms of distress (Fields, 2022). These could encompass anxiety, disordered eating, substance use disorders, and suicidal ideation (Dworkin, 2020), all of which have been documented among SA survivors. Investigating this wider array of symptoms may provide a more nuanced understanding of DFSA's psychological impact and support the development of targeted, evidence-based interventions.

1.6. Mediating role of emotional dysregulation in mental health

Given the broad spectrum of psychological outcomes observed following SA, it becomes essential to consider transdiagnostic mechanisms that may underlie these diverse responses. Emotion regulation has emerged as a central factor in this regard, particularly due to the interpersonal nature of SA, which has been shown to significantly disrupt survivors' ability to manage and respond to emotional experiences. While prior research has emphasized the association between childhood SA and emotional dysregulation (Cloitre et al., 2005), studies focusing on adult SA survivors remain scarce and often limited in scope. Ullman et al. (2014) found in a community sample of adult SA survivors that emotion

dysregulation exacerbated depressive and PTSD symptoms of SA when it was preceded by a childhood SA. However, this study does not allow for isolating the specific impact of a single adult SA on emotion dysregulation, as the participants had been revictimized, which may have affected their mental health consequences. Moreover, the scope of psychopathology explored was restricted to PTSD and depression. In terms of contextual characteristics of the assault, one study examined how emotion dysregulation may interact with DFSA experiences. Messman-Moore et al. (2013) examined a sample of college students with SA history and found that emotional dysregulation predicted DFSA revictimization among women with previous episodes of DFSA. Critically, this study primarily addressed dysregulation as a predictor of revictimization, rather than as a consequence of DFSA or a mechanism linking DFSA to broader psychopathological outcomes.

Together, these findings point to important gaps in the literature and highlight the need to examine how emotion dysregulation may mediate the development of psychological distress in adult SA survivors—particularly in relation to DFSA, whose specific features may alter the emotional and cognitive processing of the traumatic event.

1.7. Attentional biases to emotional information as the underlying mechanism of psychopathology in DFSA and non-DFSA survivors

Attentional processing toward emotional information has gained increasing interest as a potential emotional regulation mechanism involved in the development and maintenance of trauma-related symptoms. Given the central role of attention in emotion regulation and psychological functioning, attentional biases –conceptualized as the preferential allocation of attentional resources toward emotionally salient stimuli compared to neutral ones (Cisler & Koster, 2010)– may offer valuable insight into how traumatic experiences shape subsequent cognitive-affective processes (Klamecky Earl et al., 2020; Latack et al., 2017). In the context of SA, these biases may reflect adaptive or maladaptive responses to emotional stimuli and contribute to distinct psychological profiles among survivors. Importantly, the heterogeneity of SA experiences underscores once again the need for further examination of contextual factors that may

modulate attentional responses. Particularly, DFSA is relevant in this regard due to its association with fragmented trauma memories, perceptual disconnection, loss of control, and persistent uncertainty about the event (Fields et al., 2022; Gauntlett-Gilbert et al., 2004; Saint-Martin et al., 2006). These cognitive and emotional disruptions may interfere with how survivors encode, retrieve, and attend to emotional information post-assault. Consequently, exploring attentional biases in DFSA compared to non-DFSA survivors may help elucidate specific mechanisms underlying psychological distress and guide the development of tailored interventions.

1.7.1. Evidence with the Emotional Stroop Task

The emotional Stroop task is one of the most widely used paradigms to assess attentional bias, as it reveals cognitive interference through delayed color naming of emotionally salient words compared to neutral ones (Williams et al., 1996). Numerous studies have applied this task to SA survivors, including community samples of adults who experienced SA in childhood (Bremner et al., 2004; McNally et al., 2000), adulthood (Cassiday et al., 1992; Fleurkens et al., 2011; Foa et al., 1991), individuals with histories of revictimization (Field et al., 2001; Patriquin et al., 2012), and samples that did not specify the timing of the abuse (Martinson et al., 2013). These studies typically compare survivors with and without PTSD, but the findings remain mixed. While some report greater interference for trauma-related words in survivors with PTSD (Cassiday et al., 1992; Foa et al., 1991), others find no significant differences (Bremner et al., 2004; Martinson et al., 2013). Similarly, studies comparing SA survivors without PTSD to non-traumatized controls show inconsistent results: whereas Cassiday et al. (1992) observed greater interference in survivors, others did not detect group differences (Foa et al., 1991; Martinson et al., 2013; Patriquin et al., 2012). In an attempt to integrate these discrepancies, Latack et al. (2017) conducted a meta-analysis showing that SA survivors overall exhibit a significant attentional bias toward trauma-related stimuli, particularly those with PTSD, emphasizing the influence of PTSD symptomatology on attentional processing. Further clarification came from McNally et al. (2000), who examined the moderating role of trauma memory in adult survivors of childhood SA by comparing individuals

with repressed, recovered, or continuous memories to non-victimized controls. Although greater interference emerged among those with recovered and continuous memories, PTSD symptom severity was the strongest predictor of attentional bias. These findings underscore the relevance of PTSD-related symptoms, yet they leave unresolved questions about survivors who lack a coherent trauma memory—an issue particularly salient in DFSA.

Despite its valuable contributions, the emotional Stroop task presents methodological limitations, as it primarily captures generalized cognitive interference without disentangling specific attentional processes such as initial orienting or disengagement. Consequently, delays may reflect broader cognitive or emotional load rather than genuine attentional biases. To address these shortcomings, researchers have increasingly turned to tasks with higher temporal and spatial resolution, such as the dot-probe paradigm and eye-tracking methodologies.

1.7.2. Evidence with the Dot Probe Task

The dot-probe task overcame some limitations of the emotional Stroop task by specifically isolating early attentional orienting (MacLeod et al., 1986). In this paradigm, participants are briefly presented with stimulus pairs (words or facial expression images)—typically one threat-related and one neutral—followed by a probe that replaces one of the stimuli. Faster responses to probes replacing emotional stimuli are interpreted as evidence of attentional prioritization toward threat. Using this task, Hirai et al. (2022) examined attentional biases in a community sample of women grouped as follows: (i) those with a history of childhood SA (with or without adult revictimization), (ii) those with adulthood SA, and (iii) non-traumatized controls. Both SA groups exhibited greater attentional bias toward threat-related words compared to controls, although no significant differences were observed between the survivor subgroups. However, grouping childhood and revictimized cases may have obscured the specific effects of trauma timing or accumulation. Additionally, the retrospective nature of trauma reporting limits the generalizability of findings to survivors of recent assaults. Focusing on individuals with a single, recent adult SA may allow for a more accurate identification of attentional biases directly attributable to the assault.

In conclusion, despite its advantages over the Stroop task, the dot-probe paradigm also infers attentional processing indirectly through reaction times, which are influenced by broader cognitive and motor processes (Kimble et al., 2010; Thomas et al., 2013). This methodological limitation is particularly relevant in trauma-exposed populations, where attentional shifts may be rapid, unstable, or operate outside conscious awareness (Lazarov et al., 2019). As a result, recent research has increasingly turned to eye-tracking techniques, which offer continuous, direct measurement of gaze behavior and allow for a more detailed examination of the temporal dynamics and specific components of attention in response to emotionally salient stimuli.

1.7.3. Evidence with the Eye-tracking

Eye-tracking paradigms constitute one of the most ecologically valid and temporally precise methodologies for investigating attentional biases in trauma-exposed populations (Skinner et al., 2018). These methods offer continuous, direct measurements of visual attention, allowing for the disaggregation of distinct attentional processes such as initial orienting (e.g., initial fixation latency and probability), engagement (e.g., first-pass duration), and sustained attention (e.g., percentage of total fixation duration and total number of fixations) (Armstrong et al., 2013; Lazarov et al., 2019). This is particularly valuable when examining how trauma survivors navigate emotionally complex environments that mirror real-world social contexts.

Although this methodology has not yet been applied to SA survivors—nor specifically to those who experienced DFSA—related evidence from research on intimate partner violence (IPV) survivors provides a useful reference, as these survivors may have experienced sexual violence during the relationship. In a series of studies, Lee and Lee (2012, 2014) explored attentional biases in women exposed to IPV—including physical, psychological, and sexual abuse—using a free-viewing task in which four emotionally salient social scenes (threatening, happy, sad, and neutral) were displayed for 10 seconds. The authors observed that, while no differences appeared in initial orienting, survivors with PTSD symptoms exhibited increased sustained attention to threatening images relative to survivors without PTSD and non-exposed controls. Regardless of PTSD

status, survivors also showed greater attention to dysphoric stimuli and reduced attention to positive scenes when compared to controls (Lee & Lee, 2012). In a follow-up study designed to specifically assess early attentional orienting, the authors simplified the stimuli using pairs of emotional faces (e.g., angry vs. neutral; fearful vs. happy) (Lee & Lee, 2014). However, once again, no group differences emerged in initial fixation patterns. Nevertheless, a gradient in sustained attention was observed: participants with high PTSD symptoms showed the longest fixations on angry faces, followed by those with low PTSD symptoms, and finally controls. For fearful faces, both trauma-exposed groups exhibited longer fixations compared to controls, without significant differences between them.

These findings suggest that sustained attention toward threat-related cues may scale with PTSD symptom severity, particularly in response to anger-relevant stimuli. However, given the dimensional nature of PTSD and the diversity of cognitive-affective alterations it entails, future research should investigate how specific symptom clusters relate to attentional patterns. Moreover, while the IPV samples studied offer some parallels, generalization to SA survivors—and particularly DFSA survivors—remains limited due to differences in trauma characteristics and context.

Importantly, although the more recent study by Lee and Lee (2014) provided valuable findings given its experimental control focused on assessing early attention, the design used in the previous study (2012), which simultaneously presents multiple emotionally salient scenes, offers enhanced ecological validity by better simulating real-life scenarios where individuals must process competing emotional information. Applying this paradigm to SA survivors, and especially to those affected by DFSA, could offer deeper insights into how attentional systems adapt—or become dysregulated—following ambiguous, fragmentary, or poorly encoded trauma experiences. This approach could therefore represent a valuable avenue for improving both diagnostic understanding and intervention strategies in this population.

1.8. Objectives

1.8.1. General Objective

The overarching aim of this research is to deepen the understanding of the impact of DFSA in comparison to non-DFSA, with a focus on post-traumatic psychological profiles, including PTSD (assessing each symptom cluster in number and severity), a broader number of psychopathological symptoms, SF, emotion regulation, and attentional processing. This thesis seeks to investigate how the specific characteristics of DFSA may shape survivors' psychological profiles and influence key cognitive-affective mechanisms involved in trauma response. To achieve this, contextual factors were cautiously considered. A clinical sample of survivors—with and without DF—who experienced a single SA within the past year was recruited. Only survivors with no history of prior SA or other traumatic experiences or pre-existing mental health conditions were included, as there are potential individual confounding variables given its association with mental health outcomes (Dworkin, 2020; Tiihonen Möller et al., 2014). Additionally, a control group comparable in sex, age, ethnicity, and education level was recruited.

1.8.2. Specific Objectives

- i. To examine differences in PTSD symptom manifestation and SF (both baseline –assessed retrospectively– and post-assault) between DFSA and non-DFSA survivors, and the potential predictive role of PTSD symptoms on SF difficulties.
- ii. To examine differences in transdiagnostic psychological sequelae and emotional dysregulation between DFSA and non-DFSA survivors, and to determine whether emotional dysregulation predicts any of these psychological sequelae.
- iii. To compare attentional biases toward emotional stimuli (threatening, happy, and neutral) competing with control in DFSA and non-DFSA survivors using eye-tracking technology, assessing distinct phases of attention (initial orienting, engagement, and sustained attention). The role of PTSD symptom severity as a potential moderator of attentional biases will also be examined.
- iv. To assess attentional processing in a more ecologically valid context by using a free-viewing eye-tracking paradigm presenting multiple emotional scenes simultaneously (threatening, sad, happy, and neutral), and to determine whether

attentional responses differ depending on the type of SA and specific PTSD symptom clusters.

1.9. Hypothesis

1.9.1 General Hypothesis

Given the unique characteristics of DFSA—such as impaired trauma memory, heightened confusion, and perceived loss of control (Fields et al., 2022; Gauntlett-Gilbert et al., 2004)—and prior evidence linking these features to distinct post-traumatic profiles (Peter-Hagene & Ullman, 2018; Schalk et al., 2023), we hypothesize that DFSA and non-DFSA survivors will exhibit differential psychological outcomes across multiple domains, including PTSD symptom profiles, sexual functioning, emotion regulation capacities, and attentional biases toward emotional information, even when controlling for potential confounding factors.

1.9.2. Specific Hypothesis

i. *PTSD symptomatology and sexual functioning.* Based on previous research showing comparable PTSD diagnosis rates but divergent symptom patterns between DFSA and non-DFSA survivors (Fields et al., 2022), and consistent with findings on sexual functioning impairments post-assault (Van Berlo & Ensink, 2000), we hypothesize the following:

- i) Both SA groups will meet PTSD criteria at similar levels, but they will exhibit distinct symptom clusters (see Fields et al., 2022, on a clinical sample).
- ii) Both SA groups will experience a decline in SF post-assault (Van Berlo and Ensink, 2000).
- iii) Specific PTSD symptom clusters (e.g., hyperarousal, reexperiencing) will predict particular SF impairments in SA survivors (see Högbeck & Möller, 2022; Kelley & Gidycz, 2019; Schnurr et al., 2009).

ii. *Psychological sequelae and emotion dysregulation.* In line with findings that non-DFSA survivors may experience more severe psychopathological symptoms (Zinzow et al., 2010), and considering the established role of

emotional dysregulation in trauma-related mental health outcomes (Ullman et al., 2014), we hypothesize that:

- i) Non-DFSA survivors would report more psychological sequelae, as previous research suggests they exhibit higher rates of PTSD and depressive symptoms (Zinzow et al., 2010).
- ii) Emotional regulation difficulties would differ between the two SA groups, reflecting the distinct nature of the traumatic experience.
- iii) Emotional dysregulation will mediate the relationship between SA type and psychopathological outcomes, serving as a potential mechanism underlying the development of mental health disturbances. Given its role in exacerbating PTSD and depression (Ullman et al., 2014), it is expected that higher levels of emotional dysregulation will predict greater psychological distress across both groups, through potentially different pathways.

iii. *Attentional bias (Eye-tracking Study 1-comparing pairs of images)*. Building on literature examining memory fragmentation and attentional processing in trauma (McNally et al., 2000), and on attentional engagement in trauma survivors (Lee and Lee, 2014), we hypothesize:

- i) DFSA survivors will show less attentional bias toward threatening stimuli compared to non-DFSA survivors, likely resembling controls more closely (McNally et al., 2000).
- ii) No group differences will appear during early attention stages (e.g., orienting); however, we anticipate that SA survivors overall will show increased sustained attention and engagement to threatening stimuli (see Lee and Lee, 2014, for a similar task and sample).
- iii) Specific PTSD symptom severity would be associated with particular attentional bias to threat in SA survivors (see Lazarov et al., 2019, for a systematic review in PTSD samples).

iv. *Attentional bias (Eye-tracking Study 2-four emotionally charged images presented simultaneously)*. Considering prior evidence on attentional patterns in interpersonal trauma and the ecological value of complex stimuli (Lee and Lee, 2012), as well as the impact of trauma memory disruption (McNally et al., 2000), we expect that:

- i) DFSA survivors will exhibit reduced attentional bias toward threat-related images in comparison to non-DFSA survivors, showing patterns more similar to those of control participants (McNally et al., 2000)
- ii) No group differences during initial orienting will appear, but expect SA survivors, as a whole, to display greater sustained attention toward threatening and sad stimuli, and away from happy scenes, compared to controls, consistent with Lee and Lee (2012).
- iii) higher PTSD symptom severity (e.g., avoidance or hypervigilance) will be associated with increased attentional bias to threat among SA survivors (see Lazarov et al., 2019, for a systematic review).

2. Methods

2.1. Participants

Participants were recruited from CAVAS Foundation, a public outpatient mental health center specializing in sexual trauma, between October 2022 and October 2024. A total of 400 clinical records from individuals receiving services at this center were reviewed. From these, 133 cases involving civilian female survivors were selected in which the assault occurred within the previous 12 months. This inclusion criterion was established to ensure the recency of the traumatic event and to enhance the validity and clinical relevance of symptom assessment specifically related to sexual trauma. After applying exclusion criteria, 39 women were included in the study. Exclusion criteria were: (i) being under 18 years old, (ii) having experienced childhood sexual abuse or any prior adult SA, (iii) exposure to other non-sexual traumatic events (e.g., environmental disasters, kidnapping, murder of a family member, death threats), and (iv) having a prior diagnosis of a mental disorder. The selected cases were then categorized into two groups: (i) survivors of sexual assault involving physical force or coercion but without drug-facilitation (non-DFSA) (n = 20) and (ii) survivors of drug-facilitated sexual assault, regardless of whether the intake was voluntary or involuntary (DFSA) (n = 19). The decision to include a unified group of DFSA survivors was based on their shared legal and clinical outcome of incapacitation and inability to consent, which is often linked to similar psychological sequelae (i.e., loss of agency, impaired meaning-making). Additionally, a control group of

39 adult women was recruited through community advertisements. Control participants were comparable with the survivor group in age, nationality, and educational level. After applying the same exclusion criteria—plus the additional requirement that none had experienced SA—a total of 35 cases were included. An ethics committee approved the study, and all participants provided informed consent. Figure 1 displays the recruitment flowchart.

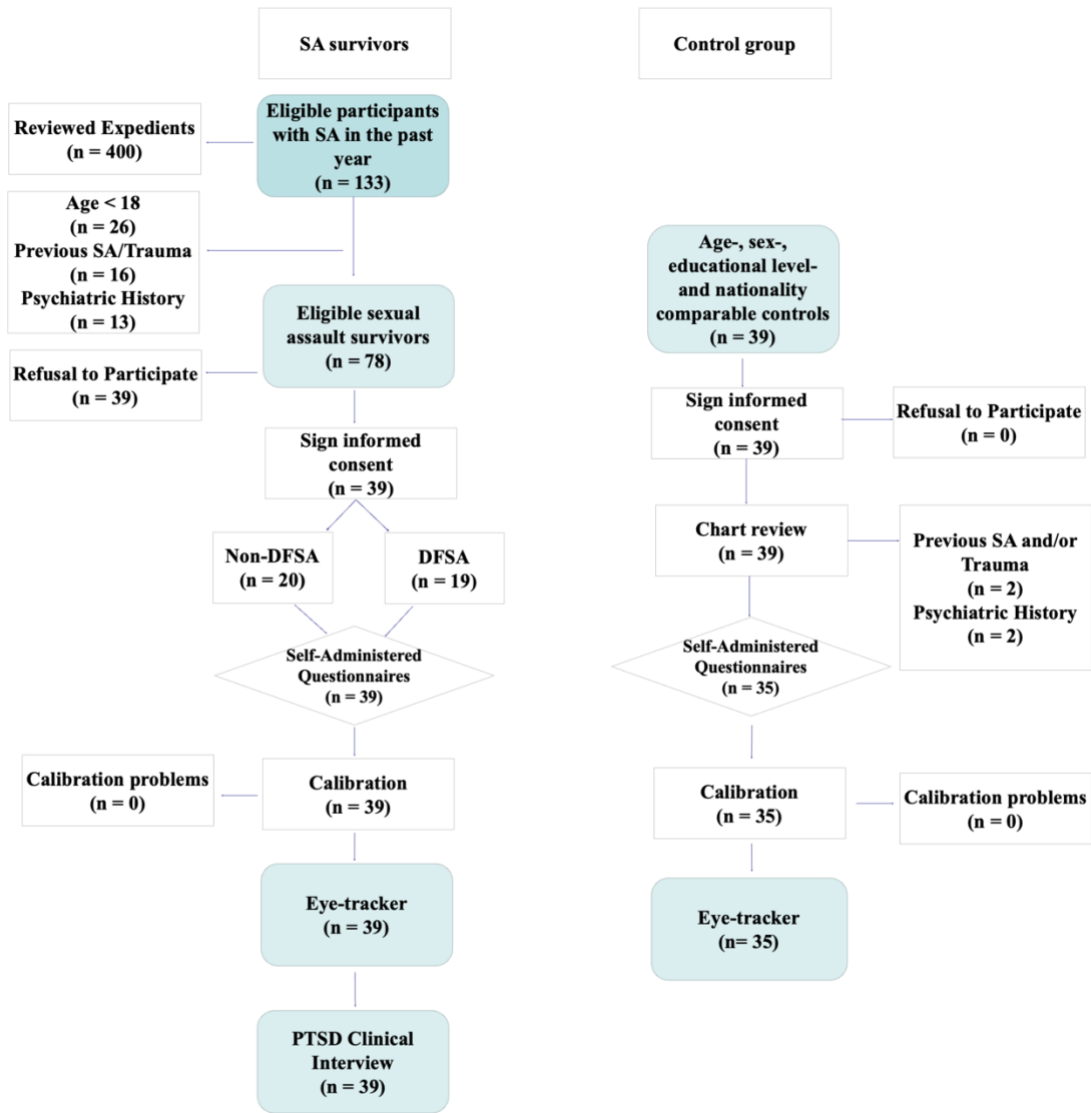


Figure 1. *Recruitment flowchart*

2.2. Materials

2.2.1. Psychometric tests

2.2.1.1. PTSD Symptom Severity and Clusters

The severity of PTSD symptoms was assessed in the survivors' groups using the PTSD Scale Clinician-Administered for DSM-5 – Past Month Version (CAPS-5; Weathers et al., 2018), which evaluates 20 PTSD symptoms on a 5-point Likert scale ranging from 0 (no impairment) to 4 (extreme impairment). PTSD severity was calculated by summing the severity scores of individual items within each DSM-5 symptom cluster. The total CAPS-5 score ranges from 0 to 80, with higher scores indicating greater PTSD severity. Symptom clusters of PTSD were also assessed with the CAPS-5, according to the DSM-5: Criterion B (Reexperiencing) includes 5 items (range: 0–20), Criterion C (Avoidance) contains two items (range: 0–8), Criterion D (Negative alterations in cognitions and mood) consists of 7 items (range: 0–28), and Criterion E (Hyperarousal) includes 5 items (range: 0–24); additionally, dissociation was assessed by summing two items. Criterion F requires that the disturbance has lasted at least one month, and Criterion G requires that the disturbance cause either clinically significant distress or functional impairment. The CAPS-5 has demonstrated high internal consistency ($\alpha = 0.88$) and test-retest reliability ($\kappa = 0.83$) (Weathers et al., 2018).

2.2.1.2. Changes in Sexual Functioning

Both the survivor and control groups completed the Spanish version of the Changes in Sexual Functioning Questionnaire (CSFQ), a validated semi-structured interview designed to assess changes in sexual function in clinical populations following events such as medication use or stressors (Bobes, M. P. Gonzalez, F. Rico-Vill, 2000; Clayton et al., 1995). The questionnaire follows DSM-IV criteria for sexual dysfunction and consists of two subscales: one measuring baseline sexual functioning retrospectively and another assessing changes in sexual function after significant events.

The survivor groups completed both subscales, whereas the control group only completed the baseline assessment, as the absence of any event affecting

sexual function was expected to result in equivalent baseline and follow-up scores. The female version of the CSFQ (34 items) was exclusively administered, as it was the most appropriate for our all-female sample. The CSFQ evaluates five key dimensions of sexual functioning through 12 primary items. The five dimensions assessed are as follows: Sexual desire/frequency, Sexual desire/interest, Sexual pleasure, Arousal/excitement, and Orgasm/completion. The total score, which will be considered as general sexual satisfaction in this study, is obtained by summing the five scale scores plus two additional questions regarding loss of arousal and painful orgasm. Responses are recorded on a 5-point Likert scale, measuring frequency ("never" to "every day"), satisfaction ("none" to "great"), or change ("no change" to "greatly improved"). The instrument has demonstrated strong psychometric properties, with high internal consistency ($\alpha = 0.80$) and test-retest reliability ($\kappa = 0.85$) (Bobes, M. P. Gonzalez, F. Rico-Vill, 2000).

2.2.1.3. Psychopathological symptoms

Psychopathological sequelae were measured with the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1994). SCL-90-R is a self-report questionnaire designed to evaluate psychological distress. It comprises 90 items, each rated on a five-point Likert scale from 0 (Never) to 4 (Always), indicating how frequently the respondent experiences various symptoms. The instrument assesses nine symptom dimensions: somatization (12 items), which evaluates physical distress related to psychological factors; obsessive-compulsive traits (10 items), assessing intrusive thoughts and repetitive behaviors; interpersonal sensitivity (9 items), measuring discomfort in social interactions; anxiety (10 items), capturing excessive worry and physiological arousal; depression (13 items), assessing feelings of sadness and hopelessness; anger-hostility (6 items), evaluating irritability and aggressive tendencies; phobic anxiety (7 items), measuring irrational fears and avoidance behaviors; paranoid ideation (6 items), assessing distrust and suspicion; and psychoticism (10 items), which evaluates disorganized thinking and perceptual distortions, along with an additional category of "extra items" (7 items). The SCL-90-R also generates a Global

Severity Index (GSI), which represents the average score across all 90 items and was utilized in the present study.

2.2.1.4. Emotional dysregulation

Difficulties in emotion regulation were assessed using the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), with the Spanish adaptation by Hervás and Jódar (2008). This 28-item instrument examines various dimensions of emotional regulation. Specifically, it evaluates lack of emotional control (9 items), rejection or non-acceptance of emotional distress (7 items), daily life interference, including difficulties with concentration and task performance (4 items), challenges in identifying and attending to one's emotions (4 items), and emotional confusion (4 items). Each item is rated on a 5-point Likert scale, ranging from 1 (almost never) to 5 (almost always), yielding a total score between 28 and 140. Higher scores indicate greater difficulties in emotion regulation.

2.2.2. Eye-tracking Task 1

The stimuli included 128 scenes selected from the *International Affective Picture System* (IAPS; Lang et al., 2005). The stimuli were identical to those used in Nummenmaa et al. (2006) and varied only in emotional valence and arousal, while being matched for visual properties such as complexity and luminance. Sixteen images were selected for each category of happy, threatening, and neutral social scenes. Happy scenes depicted individuals with positive affect, threatening scenes showed either hostile individuals or people in threatening situations, and neutral scenes portrayed individuals engaged in everyday activities. Additionally, 80 non-social control images of inanimate objects were included. Valence ratings indicated that happy images were rated more positively than both threatening and control images, and that neutral and control images were rated more positively than threatening ones, with no significant difference between neutral and control images. In terms of arousal, happy and threatening images elicited higher arousal ratings than neutral and control images, though no differences were found between happy and threatening stimuli, or between neutral and control stimuli. Participants viewed 64 trials (48 experimental, 16 filler), each composed of two randomly paired images. These included 16 trials

each for happy-control, threatening-control, and neutral-control pairs, along with 16 filler trials of neutral-control pairs. Each trial began with a central fixation cross, which disappeared after a steady gaze. Image pairs appeared for 3 seconds in diagonally opposite screen corners, with image positions counterbalanced across trials. See Figure 2 for an example trial. Randomization of presentation order and image placement ensured that participants could not rely on a fixed visual scanning strategy.

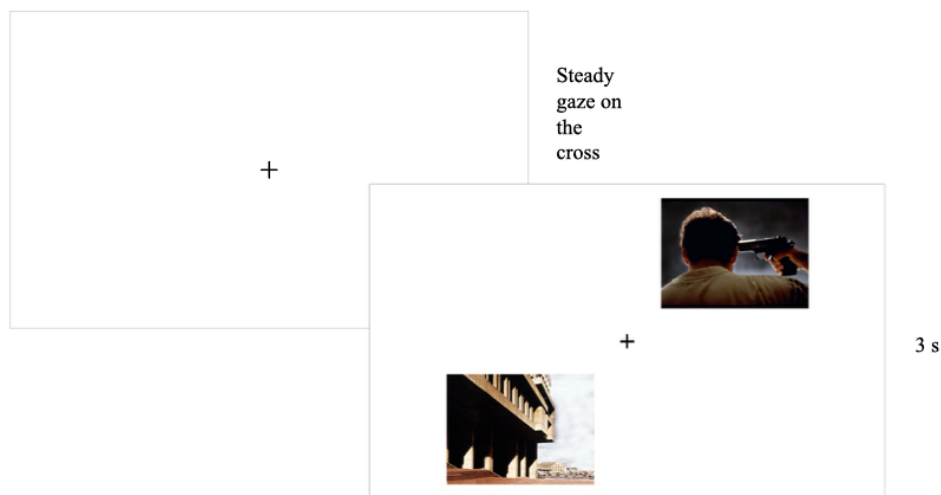


Figure 2. *Example of a trial with a threatening image vs a neutral image from the free-viewing task*

Data were processed using a velocity-based algorithm, applying a minimum fixation duration threshold of 100 ms and a peak velocity threshold of 40°/s to identify fixation events. Areas of interest (AOIs) were defined as the full extent of each visual scene. To examine different stages of attentional processing, several eye-tracking measures were extracted. Early attentional processes, referred to as orienting, were assessed through the latency and direction of initial eye movements occurring immediately after stimulus onset. These were captured using two indices: (i) initial fixation latency, measuring the time (in ms) taken to first fixate on the target scene, and (ii) initial fixation probability, indicating the likelihood that the first fixation landed on the target scene. Subsequent attentional engagement—operationalized here as the depth

of attentional allocation during the first encounter with a stimulus—was indexed by (iii) first-pass duration (i.e., the sum of fixation durations made on the image during its initial viewing, before the gaze shifted away). Finally, sustained attention, or the prolonged allocation of attention over time, was assessed through two complementary indices: (iv) percentage of total duration, capturing the proportion of the entire viewing time (including re-fixations) spent on the target scene during the 3-second presentation window, and (v) percentage of total fixations, representing the proportion of the total number of fixations and re-fixations on the scene throughout the viewing period.

2.2.3. Eye-tracking Task 2

The stimuli consisted of 80 images from the *International Affective Picture System* (IAPS; Lang et al., 2005), the same set used by Kellough et al. (2008). The images were categorized into four emotional groups: happy, neutral, sad, and threatening. Although IAPS images are rated on two emotional dimensions—valence (1 = unpleasant, 5 = neutral, 9 = pleasant) and arousal (1 = calm, 9 = excited)—they are not sorted into specific discrete emotions. To clarify this, Kellough et al. (2008) conducted a pilot study to determine whether the unpleasant images were better described as threatening or sad. The task included 20 trials (12 experimental and 8 filler). Each trial started with a fixation cross in the center of the screen for 1000 ms, followed by a 20-second presentation of four images shown simultaneously. In the 12 experimental trials, each set of images included one from each emotional category (happy, neutral, sad, and threatening). Image positions were randomized within each trial, with the constraint that each emotional category appeared in each of the four quadrants exactly three times across the 12 trials. See Figure 3 for an example trial. The order of trials was also randomized across participants. The 8 filler trials, designed to mask the purpose of the task, consisted of four neutral images each.

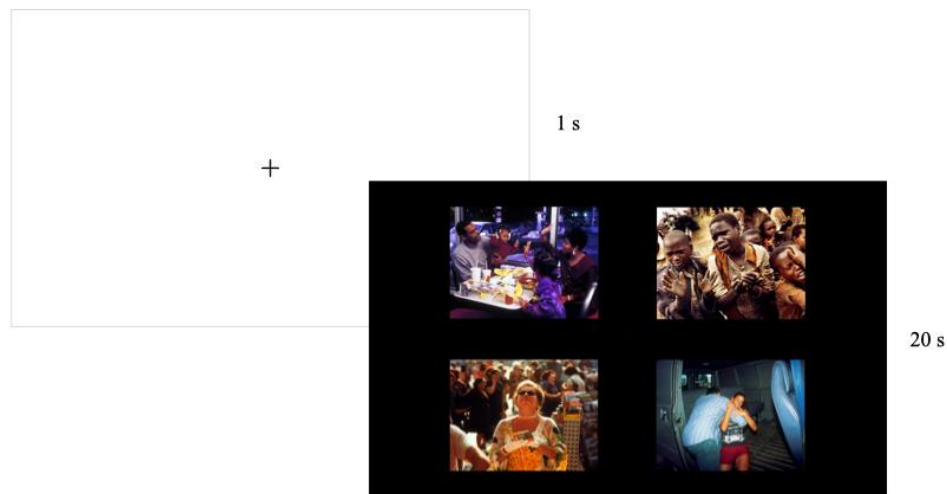


Figure 3. *Example of a trial from the free-viewing task, showing the simultaneous presentation of four emotional scenes (happy, sad, neutral, and threatening)*

Data were processed using a velocity-based algorithm, applying a minimum fixation duration threshold of 100 ms and a peak velocity threshold of 40°/s to identify fixation events. Areas of interest (AOIs) were defined as the full extent of each visual scene. To examine different stages of attentional processing, several eye-tracking measures were extracted. Early attentional processes, referred to as orienting, were assessed through the latency and direction of initial eye movements occurring immediately after stimulus onset. These were captured using two indices: (i) initial fixation latency, measuring the time (in ms) taken to first fixate on the target scene, and (ii) initial fixation probability, indicating the likelihood that the first fixation landed on the target scene. Subsequent attentional engagement—operationalized here as the depth of attentional allocation during the first encounter with a stimulus—was indexed by (iii) first-pass duration (i.e., the sum of fixation durations made on the image during its initial viewing, before the gaze shifted away). Finally, sustained attention, or the prolonged allocation of attention over time, was assessed through two complementary indices: (iv) percentage of total duration, capturing the proportion of the entire viewing time (including re-fixations) spent on the target scene during the presentation window (3-seconds for the task 1 and 20-seconds

for the task 2), and (v) percentage of total fixations, representing the proportion of the total number of fixations and re-fixations on the scene throughout the viewing period.

2.3. Apparatus

Eye movements were recorded using a portable Tobii Pro Fusion Eye Tracker with a 250 Hz sampling rate; no chin-rest was used since the apparatus allowed head movement with a high-precision gaze tracking. Visual stimuli were displayed on a 23.8" ASUS VA249HE Full HD (1920 × 1080) LED monitor with a 60 Hz refresh rate, positioned at a viewing distance of 60 cm.

2.4 Procedure

All participants were individually assessed in a quiet room during a single 90-minute session, with all questionnaires administered by a clinician at the Foundation, where survivors had previously sought support. As part of a broader study, all participants attended in-person appointments. The session began with signing the informed consent form, followed by a semi-structured sociodemographic interview. Subsequently, participants completed the psychometric assessments.

To carry out eye-tracker tasks, they were seated in a height-adjustable chair in a dimly lit, sound-attenuated room. Participants were asked to fixate a point that moved to nine distinct locations on the screen, followed by a validation of four points, with acceptable error $<1.5^{\circ}$. The calibration was repeated until this criterion was met. Participants were instructed to free-view the images naturally, “as if looking at a photo album”. The experimenter monitored calibration and performance in real time.

2.4. Data analysis

Data were summarized using means and standard deviations for continuous variables and absolute and relative frequencies for categorical variables.

Objective 1: PTSD and SF in DFSA and non-DFSA survivors. Firstly, two MANOVAs were conducted to analyze the CAPS-5 symptom subscales (i.e., reexperiencing, avoidance, negative cognitions and mood, hyperarousal, and distress) related to the number and severity of PTSD symptoms. Two mixed ANOVAs were used to examine the number of symptoms and severity of overall PTSD, with Group (non-DFSA, DFSA) as the between-group variable. Chi-squared tests were applied to assess differences in the presence of PTSD and dissociative symptomatology between groups. Secondly, mixed ANOVAs were performed for the CSFQ subscales, with Time of Assessment (Baseline, Follow-up) as the within-group variable and Group (non-DFSA, DFSA, control) as the between-group variable. Note that the control group was assessed only once, assuming no changes in SF due to the absence of a significant event. Thirdly, linear regression models were run for the change in each dimension of the SF, using the CAPS-5 symptom subscales (reexperiencing, avoidance, negative cognitions and mood, hyperarousal, and distress) as potential predictors for SA survivors. All data, analysis, and research materials are available by emailing the corresponding author. All statistical analyses were conducted using Jamovi (version 2.6).

Objective 2: Psychopathological Sequelae and Emotional Regulation Difficulties in DFSA and Non-DFSA Survivors. First, two MANOVAs were performed to analyze the SCL-90 subscales (Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism) and the DERS subscales (Lack of Emotional Control, Non-acceptance of emotional distress, Daily Life Interference, Inattention to one's emotions, and Emotional Confusion), with Group (non-DFSA, DFSA, control) as the between-subjects factor. Second, linear regression models were applied to each SCL-90 dimension where significant differences emerged between the non-DFSA and DFSA groups, using the DERS subscales as potential predictors of mental health symptoms in SA survivors. All statistical analyses were conducted using SPSS (version 30.0.0).

Objective 3: Attentional bias in a two-emotional stimuli free-viewing eye-tracking task. Eye movement data were analyzed using a 3 (Group: non-DFSA, DFSA, Control) $\times$ 3 (Valence: neutral, happy, threatening) mixed-design analysis of variance (ANOVA), with Group as the between-subjects factor and Valence as the within-subjects factor. When a significant interaction between Group and Valence was observed, follow-up simple effects analyses were conducted. For comparisons involving the Valence factor, p-values were adjusted using the Bonferroni correction to control for multiple comparisons. In addition, exploratory correlation analyses were conducted within the non-DFSA and DFSA groups to assess the associations between attentional outcomes and PTSD symptom severity, as measured by CAPS-5 scores.

Objective 4: Attentional bias in a four-emotional stimuli free-viewing eye-tracking task. Statistical analyses involved a 3 (Group: non-DFSA, DFSA, Control) $\times$ 4 (Valence: happy, sad, threatening, neutral) mixed-design ANOVA, with Group treated as a between-subjects variable and Valence as a within-subjects variable. When significant Group $\times$ Valence interactions emerged, simple effects analyses were conducted to examine differences across groups at each level of valence. To account for multiple comparisons, Bonferroni corrections were applied to post hoc tests involving the Group factor. Additionally, exploratory correlational analyses were carried out within the SA and DFSA subgroups to examine the relationship between eye movement indices and PTSD symptom severity, as assessed by total CAPS-5 scores.

3. Results

The sample consisted of 74 participants divided into three groups: survivors of non-DFSA (N = 20), survivors of DFSA (N = 19), and a control group (N = 35). The groups were comparable in sex, age, educational level, and nationality (all $ps > .069$). Among the DFSA group, 31.6% reported voluntary substance intake, 15.8% involuntary intake, and 53.6% a mixed intake; most reported mixed ingestion (e.g., alcohol and other substances). Memory impairment also varied significantly ($p = .037$), with the DFSA group showing a higher proportion of survivors with partial or no memories. Conversely, the

survivor groups were comparable in terms of the type of assault, time since the assault, and relationship with the aggressor (all $ps > .13$). Sociodemographic details are presented in Table 1.

Table 1. Sociodemographic data of non-DFSA survivors, DFSA survivors, and the Control group

	Non-DFSA(n= 20)	DFSA(n= 19)	Control (n= 35)	p
Females (n)	20	19	35	
Age	25.3 (7.29)	30.2 (8.81)	24.8 (5.17)	.069
Education (n)				.172
Primary studies	3	1	0	
Secondary studies	6	5	14	
University Studies	11	13	21	
Nationality (n)				.087
European	15(75%)	12(63.2%)	31(88.6%)	
Latin American	5(25%)	7(6.8%)	4(11.4%)	
Sexual Orientation (n)				.778
Heterosexual	16(80%)	15(78.9%)	30(85.7%)	
Homosexual	0	0	0	
Bisexual	4(20%)	4(21%)	5(14.3%)	
Religion (n)				.404
Believer	9(45%)	10(52.6%)	12(34.3%)	
Non-believer	11(55%)	9(47.4%)	23(65%)	
Marital Status (n)				.523
With a partner	8(40%)	7(36.8%)	18(51.4%)	
Without a partner	12(60%)	12(63.2%)	17(48.6%)	
Type of SA (n)				.2
With penetration	8(40%)	15(78.9%)		
Without penetration	12(60%)	4(21.1%)		
Time since the assault	10.10(7.23)	8.58(5.75)		.475
Injuries after SA (n)				.345
Severe (fractures, vaginal/anal tears)	4(20%)	2(10.5%)		
Mild (contusions)	9(45%)	6(31.6%)		
No injuries	7(35%)	11(57.9%)		
Type of intake (n)				<.001

Voluntary intake	0	6(31.6%)	
Involuntary intake	0	3(15.8%)	
Mixed intake	0	10(53.6%)	
No intake	20(100%)	0	
Substance Ingested			
Alcohol		7(36.8%)	<.001
Other substances (drugs or medication)		3(15.8%)	
Mixed substances		9(47.4%)	
Report (n)	16(80%)	15(78.9%)	.935
Pregnancy (n)	0	0	
Memory of the assault			
No memories	3(15%)	8(42.1%)	.037
Partial memories	5(25%)	7(36.8%)	
Full memory	12(60%)	4(21.1%)	
Number of therapy sessions	4.4 (4.45)	2.36 (5.49)	.00
Number of perpetrators	1 (0.00)	1.15 (0.37)	.00
Age of perpetrator	32.35 (13.56)	28.84 (14.69)	.00
Nationality of perpetrator (n)			
Same as the survivor	14(70%)	6(31.6%)	.15
Different from the survivor	6(30%)	13(68.4%)	
Male perpetrators (n)	20 (100%)	19(100%)	
Relationship with the perpetrator (n)			
Stranger	4(20%)	5(26.3%)	.13
Recent acquaintance	7(35%)	11(57.9%)	
Intimate relationship	9(45%)	3(15.8%)	
Scenario of the assault (n)			
Private	13(65%)	15(78.9%)	.33
Public	7(35%)	4(21.1%)	

Percived psychological consequences (n)	16(80%)	16(84.2%)	.73
Sexually transmitted infections (n)	5(25%)	3(15.8%)	.47

DFSA = drug-facilitated sexual assault; SA = sexual assault

Note. Data are presented as frequency (N) or means (M), with standard deviations (SD) shown in parentheses.

3.1. Objective 1- PTSD and SF in DFSA and non-DFSA survivors

3.1.2. Number and Severity of each PTSD symptom cluster

Table 2 presents the number and severity of each PTSD symptom cluster in each survivor group.

Table 2. PTSD symptom number and severity measured by the CAPS-5 scale for non-DFSA and DFSA survivor groups

	Non-DFSA (M, SD)	DFSA (M, SD)
Number of Symptoms		
Reexperiencing	4.10 (0.85)	3.05 (1.58)
Avoidance	1.70 (0.47)	1.47 (0.70)
Negative cognition and mood	4.35 (1.84)	3.79 (1.58)
Hyperarousal	3.50 (1.70)	3.10 (1.94)
Distress	2.60 (0.68)	1.89 (1.24)
Dissociative	0.60 (0.75)	0.00 (0.00)
Severity		
Reexperiencing	12.65 (3.30)	8.84 (4.39)
Avoidance	5.20 (1.36)	4.21 (1.51)
Negative cognition and mood	13.70 (6.04)	11.31 (4.57)
Hyperarousal	11.75 (5.63)	9.52 (5.71)
Distress	7.55 (2.48)	5.26 (2.60)
Dissociative	1.70 (2.10)	0.05 (0.23)
Total Number of Symptoms	13.65 (3.53)	11.42 (4.42)
Total Severity	43.30 (13.21)	33.89 (12.72)

DFSA = drug-facilitated sexual assault; PTSD = Post-traumatic stress disorder; CAPS-5: Clinician-Administered PTSD Scale for DSM-5

Note. Data are presented as means (M), with standard deviations (SD) shown in parentheses.

The MANOVA for PTSD symptom count showed a significant group effect ($F(6, 32) = 3.75, p = .006$; *Pillai's trace* = .413). Intrusion symptoms ($F(1, 37) = 6.73, p = .013$), distress or impairment ($F(1, 37) = 4.90, p = .033$), and dissociation ($F(1, 37) = 12.017, p = .001$) were more pronounced in the non-DFSA group. No significant group differences were observed for arousal and reactivity ($F(1, 37) = 0.46, p = .503$), avoidance behaviors ($F(1, 37) = 1.42, p = .240$), or mood disturbances ($F(1, 37) = 1.03, p = .316$). See Figure 4 for the number of PTSD symptom cluster comparisons across groups.

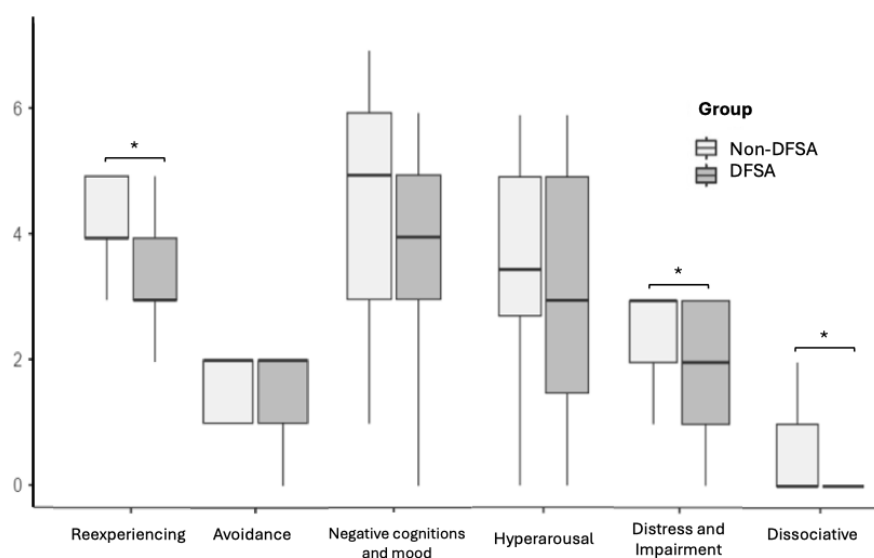


Figure 4. Box plot displaying the distribution of PTSD symptom number (CAPS-5) for non-DFSA and DFSA survivor groups

Note: Boxes represent mean values; error bars indicate the standard error of the mean. Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

The MANOVA for PTSD symptom severity also showed a significant group effect ($F(6, 32) = 3.31, p = .012$; *Pillai's trace* = .383). The non-DFSA group exhibited higher severity in intrusions ($F(1, 37) = 9.45, p = .004$), avoidance

behaviors ($F(1, 37) = 4.62, p = .038$), distress or impairment ($F(1, 37) = 7.90, p = .008$), and dissociation ($F(1, 37) = 11.49, p = .002$). No group differences were found for arousal and reactivity ($F(1, 37) = 1.50, p = .228$) or mood disturbances ($F(1, 37) = 1.91, p = .175$). See Figure 5 for the severity of PTSD symptom cluster comparisons across groups.

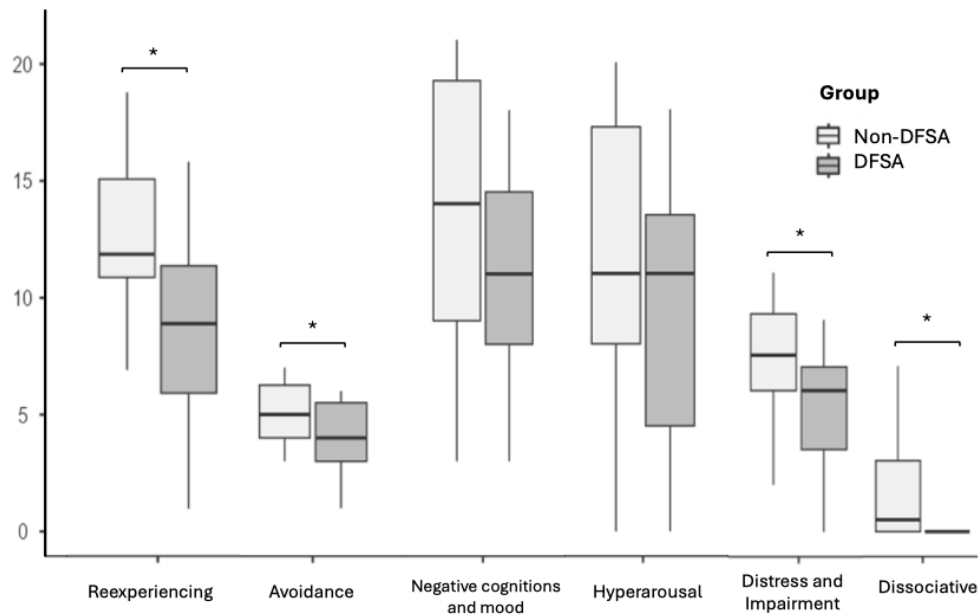


Figure 5. Box plot displaying the distribution of PTSD symptom severity scores (CAPS-5) for non-DFSA and DFSA survivor groups

Note: Boxes represent mean values; error bars indicate the standard error of the mean. Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

3.1.2. Presence of PTSD

To assess the proportion of participants meeting PTSD criteria, descriptive data showed that 14 non-DFSA survivors and nine DFSA survivors met PTSD criteria. However, the chi-square test revealed no significant differences between groups, $\chi^2(1) = 2.06, p = .151$.

3.1.3. Changes in SF after SA

Table 3 displays comparisons of baseline and follow-up levels of each CSFQ domain for each survivor group.

Table 3. Comparison of sexual functioning scores (CSFQ) at baseline and follow-up across non-DFSA, DFSA, and control groups

	Time of Assesment	Non-DFSA	DFSA	Control
Desire and Frequency	Baseline	6.70 (1.41)	7.16 (1.3)	6.69 (0.95)
	Follow-Up	4.20 (1.70)	5.05 (2.09)	6.69 (0.95)
Desire and Interest	Baseline	8.20 (2.19)	8.47 (2.29)	9.00 (1.98)
	Follow-Up	5.10 (2.22)	5.95 (2.39)	9.00 (1.98)
Pleasure	Baseline	3.75 (0.91)	4.05 (0.62)	3.53 (1.02)
	Follow-Up	2.00 (1.02)	2.11 (1.15)	3.53 (1.02)
Arousal	Baseline	9.50 (2.68)	10.16 (2.26)	10.61 (1.69)
	Follow-Up	6.25 (3.05)	6.68 (3.16)	10.61 (1.69)
Orgasm	Baseline	9.15 (2.73)	10.47 (2.45)	10.83 (1.71)
	Follow-Up	6.05 (3.15)	7.11 (3.49)	10.83 (1.71)
Total SF	Baseline	41.20 (7.38)	44.32 (6.22)	44.28 (4.48)
	Follow-Up	27.55 (10.60)	30.58 (11.09)	44.28 (4.48)

DFSA = drug-facilitated sexual assault; CSFQ = Changes in Sexual Functioning Questionnaire

Note. Data are presented as means (M), with standard deviations (SD) shown in parentheses.

See Figure 6 for CSFQ scores at baseline and follow-up across groups for each subcale.

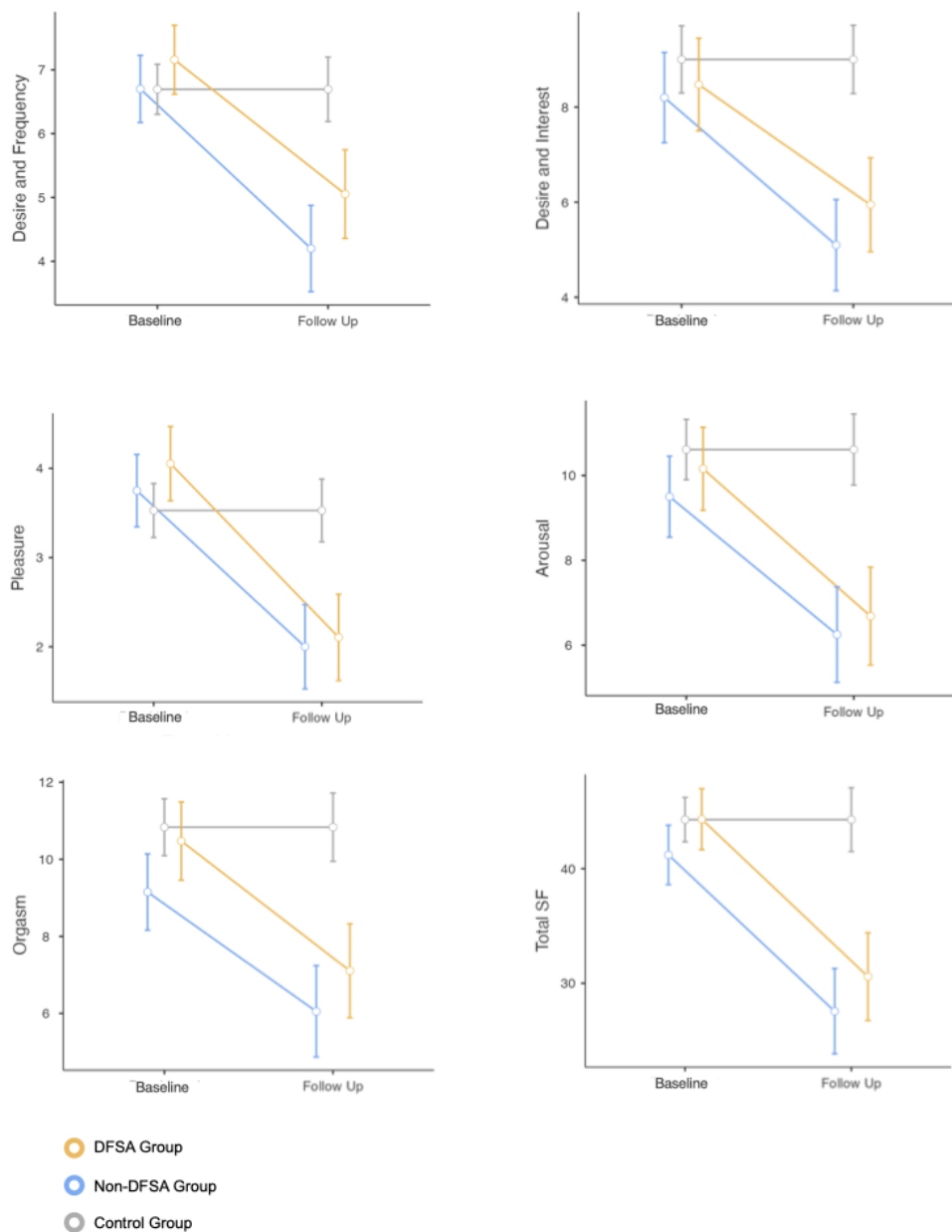


Figure 6. Graphs showing the results in each domain of sexual functioning on the CSFQ scale for the non-DFSFA group, the DFSFA group, and the control group.

Desire and Frequency

A mixed ANOVA revealed significant effects for Group ($F(2,72) = 7.88, p < .001; \eta^2 = .092$) and Time of Assessment ($F(1,72) = 71.9, p < .001; \eta^2 = .5$), along with a significant interaction ($F(2,72) = 22.4, p < .001; \eta^2 = .383$).

Post-hoc analysis showed no baseline differences between groups (all $ps = 1.00$). However, within-group comparisons indicated significant reductions in desire and frequency for both non-DFSA ($t(72) = 7.435, p < .001$) and DFSA ($t(72) = 6.102, p < .001$) survivors.

Desire and Interest

Both main effects for Time of Assessment ($F(1,72) = 61.0, p < .001; \eta^2 = .119$) and Group ($F(2,72) = 11.7, p < .001; \eta^2 = .245$) were significant, as was the interaction effect ($F(2,72) = 19.1, p < .001; \eta^2 = .347$).

Post-hoc analysis showed no baseline differences between groups (all $ps = 1.00$). However, within-group comparisons indicated significant reductions in desire and interest for non-DFSA ($t(72) = 6.949, p < .001$) and DFSA ($t(72) = 5.520, p < .001$) survivors.

Pleasure

Main effects for Time of Assessment ($F(1,72) = 143.2, p < .001, \eta^2 = .135$) and Group ($F(2,72) = 3.87, p = .025, \eta^2 = .269$) were significant. Additionally, a significant interaction effect was observed ($F(2,72) = 43.8, p < .001, \eta^2 = .135$).

Post-hoc intergroup comparisons at baseline indicated no significant differences between the three subgroups (all $ps > .69$). Regarding within-group changes over time, post-hoc analyses revealed significant declines in Pleasure scores for both the non-DFSA group ($t(72) = 9.148, p < .001$) and the DFSA group ($t(72) = 9.922, p < .001$).

Arousal

Both main effects for Time of Assessment ($F(1,72) = 62.3, p < .001, \eta^2 = .133$) and Group ($F(2,72) = 14.3, p < .001, \eta^2 = .180$) were found, and so was the interaction effect ($F(2,72) = 19.0, p < .001, \eta^2 = .081$).

Post-hoc intergroup comparisons at baseline showed no significant differences between the three subgroups (all $ps = 1.00$). For within-group comparisons, significant declines in Arousal scores were observed for both the non-DFSA group ($t(72) = 6.163, p < .001$) and the DFSA group ($t(72) = 6.420, p < .001$).

Orgasm

Significant main effects for Time of Assessment ($F(1,72) = 48.3, p < .001, \eta^2 = .113$) and Group ($F(2,68) = 16.7, p < .001, \eta^2 = .206$), with a significant interaction effect ($F(2,72) = 14.8, p < .001, \eta^2 = .069$) was found.

Post-hoc intergroup comparisons at baseline indicated no significant differences among the three subgroups (all $ps > .12$). For within-group comparisons, substantial declines in Orgasm scores were found for both the non-DFSA group ($t(72) = 5.379, p < .001$) and the DFSA group ($t(72) = 5.697, p < .001$).

3.1.4. PTSD risk factors of SF difficulties in SA survivors

A significant regression model was found for Desire and Frequency decline, $F(1, 38) = 6.34, p = .016, R^2 = .15, R^2_{Adjusted} = .12$. The analysis indicated that Desire and Frequency deterioration was predicted by: + .48 + .15 mood disturbances severity. Similarly, a significant regression model was found for Desire and Interest decline, $F(1, 38) = 9.08, p = .005, R^2 = .20, R^2_{Adjusted} = .18$. Desire and Interest deterioration was predicted by: + .53 + .22 reactivity severity. For Pleasure decline, a significant regression equation was found, $F(2, 38) = 5.09, p = .011, R^2 = .22, R^2_{Adjusted} = .18$. Pleasure deterioration was predicted by: + 1.20, + .27 mood disturbances severity, - .68 mood disturbances symptom count. Regarding Orgasm decline, a significant regression equation was identified, $F(2, 38) = 9.78, p < .001$,

$R^2 = .35$, $R^2_{Adjusted} = .328$. Orgasm deterioration was predicted by: + .10, + .91 reactivity severity, and -1.98 reactivity symptoms count. Conversely, no significant regression model was found for Arousal decline.

3.2. Objective 2- Psychopathological Sequelae and Emotional Regulation Difficulties in DFSA and Non-DFSA Survivors

3.2.1 Psychopathological symptoms and emotional dysregulation.

Table 4 presents the SCL-90-R scores and the DERS scores in each group.

Table 4. *Psychopathological symptoms (SCL-90-R) and emotional dysregulation (DERS) in non-DFSA survivors, DFSA survivors, and the Control group*

SCL-90-R	Non-DFSA (N=20)	DFSA (N=19)	Control (N=35)
Somatization	2.26(0.98)	2.04(0.77)	0.88(0.62)
Obsessive-Compulsive	2.69(0.69)	2.24(0.95)	1.41(0.75)
Interpersonal Sensitivity	2.27(0.82)	1.81(0.87)	0.97(0.72)
Anxiety	2.84(0.82)	2.11(0.87)	1.00(0.7)
Depression	2.79(0.84)	2.20(0.71)	1.19(0.77)
Anger-Hostility	1.18(1.03)	1.06(0.82)	0.49(0.45)
Phobic Anxiety	2.31(0.92)	1.87(0.85)	0.46(0.51)
Paranoid Ideation	2.28(0.88)	1.77(0.93)	1.87(0.85)
Psychoticism	2.00(0.8)	1.32(0.82)	0.62(0.57)
Global Severity Index	2.37(0.69)	1.91(0.65)	0.91(0.55)
DERS			
Confusion	11.60(3.81)	10.32(4.21)	8.67(3.14)
Inattention	12.20(3.99)	9.74(4.10)	2.33(3.54)
Non-acceptance	24.55(8.32)	22.05(6.87)	16.14(7.38)
Interference	14.60(4.17)	13.63(4.78)	11.22(4.16)
Lack of control	24.60(5.88)	22.32(10.21)	17.19(8.22)

DFSA = drug-facilitated sexual assault; SCL-90-R = Symptom Checklist-90-Revised; DERS = Difficulties in Emotion Regulation Scale

Note. Data are presented as means (M), with standard deviations (SD) shown in parentheses.

The MANOVA for SCL-90-R subscales showed a significant group effect, $F(18, 130) = 4.95, p < .001$; *Pillai's trace* = .814. All SCL-90 subscales showed differences among groups (all $ps < .002$). Bonferroni pair comparison indicates that both non-DFSA and DFSA groups have higher symptomatology than the control group in all areas (all $ps < .20$). However, when SA groups are compared, non-DFSA survivors showed higher symptoms than DFSA ones in Anxiety ($p = .016$) and Psychoticism ($p = .013$). See Figure 7 for the comparison of the SCL-90 subscales across groups.

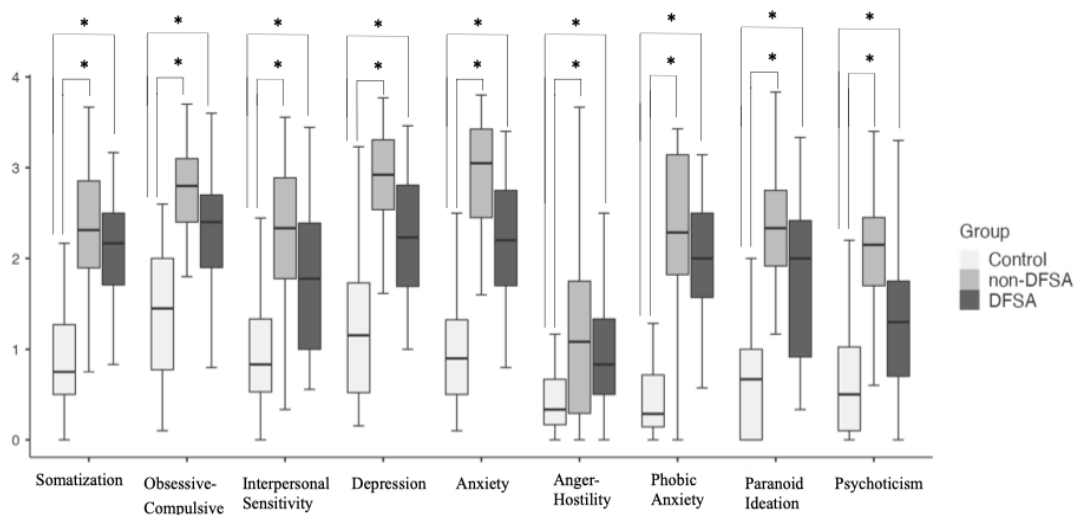


Figure 7. Boxplot for the mean of psychological symptoms (SCL-90-R) for the control group, non-DFSA survivors, and DFSA survivors

Note: Boxes represent mean values; error bars indicate the standard error of the mean. Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

The MANOVA for DERS subscales also showed a significant group effect ($F(10, 132) = 2.07, p = .031$; *Pillai's trace* = .271). All DERS subscales showed differences among groups (all $ps < .031$). Bonferroni pair comparison indicates that while the non-DFSA group showed worse functioning in all DERS subscales than the control group (all $ps < .031$), the DFSA group only showed worse functioning in the Non-acceptance of Emotions domain ($p = .020$). No other significant differences were found (all $ps > .121$). See Figure 8 for the comparison of the DERS subscales across groups.

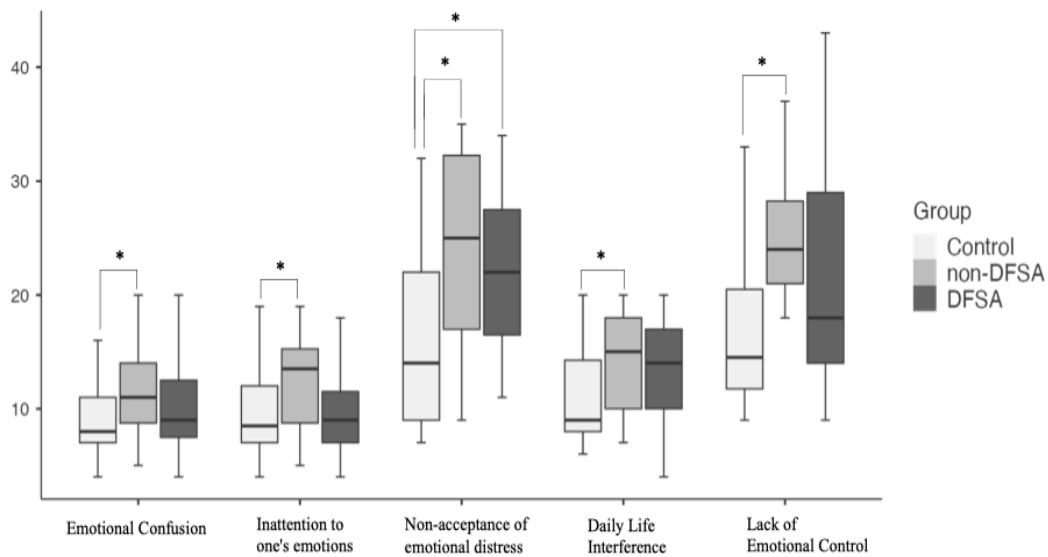


Figure 8. Boxplot for the mean of emotional dysregulation domains (DERS) for the control group, non-DFSA survivors, and DFSA survivors

Note: Bars represent mean values; error bars indicate the standard error of the mean. Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

3.2.2 Emotional regulation domains as risk factors of psychopathological symptoms in SA survivors.

A significant regression model was found for the Anxiety SCL-90 subscale, $F(2, 35) = 19.86$, $p < .001$, $R^2 = .53$, $R^2_{Adjusted} = .51$. The analysis indicated that anxiety symptomatology was predicted by + .26, + .05 lack of emotional control, and + .04 Non-acceptance of Emotions. Similarly, a significant regression model was found for Psychoticism SCL-90 subscale, $F(2, 35) = 6.56$, $p < .001$, $R^2 = .45$, $R^2_{Adjusted} = .42$. The analysis indicated that psychoticism symptomatology was predicted by: - .31, + .04 lack of emotional control, and + .04 Non-acceptance of Emotions.

3.3. Objective 3- Attentional bias in a two-emotional stimuli free-viewing eye-tracking task

Descriptive data of the eye-tracking measures are displayed in Table 5.

Table 5. *Eye-Tracking Measures for Neutral, Happy, and Threatening Stimuli Across Each Group*

		Neutral	Happy	Threatening
Latency of first fixation (ms)	non-DFSA	777.40(240.27)	722.09(250.29)	693.49(279.26)
	DFSA	738.19(204.88)	624.01(175.56)	619.63(279.26)
	Control	731.93(194.49)	638.73(185.55)	670.25(201.33)
Probability of first fixation (%)	non-DFSA	53.75(8.45)	54.06(7.66)	53.13(14.97)
	DFSA	53.62(11.08)	55.92(9.42)	55.59(15.71)
	Control	54.57(9.60)	56.23(11.03)	58.31(9.17)
First-pass duration (ms)	non-DFSA	1020.73(279.02)	1061.24(305.73)	1137.68(296.15)
	DFSA	1019.02(268.48)	1227.74(396.3)	1351.68(392.19)
	Control	1111.97(246.94)	1227.25(291.56)	1209.15(226.7)
Percentage of total duration (%)	non-DFSA	52.40(7.11)	54.70(7.13)	56.01(10.02)
	DFSA	51.24(5.06)	58.25(8.96)	62.30(10.22)
	Control	55.36(8.72)	59.73(11.13)	57.94(7.21)
Percentage of total fixation (%)	non-DFSA	52.87(4.99)	53.80(6.63)	55.44(8.71)
	DFSA	49.92(3.99)	56.93(8.63)	60.31(8.66)
	Control	54.73(7.43)	58.84(10.26)	56.94(5.74)

DFSA = drug-facilitated sexual assault; ms = milliseconds

Note. Data are presented as means, with standard deviations shown in parentheses.

3.3.1. Initial fixation latency

The ANOVA of the latency of initial fixation only showed that the effect of Valence approached significance, $F(2,142) = 13.11$, $p < .001$, $\eta^2 = .16$, with significantly shorter latencies for happy and threatening images compared to neutral ones (all $ps < .001$). Neither the effect of Group nor the Valence x Group interaction was significant (all $Fs < 1$).

3.3.2. Initial fixation probability

Neither the Group, the Valence effect, nor the Valence x Group interaction was significant (all F s < 1).

3.3.3. First-pass duration

The ANOVA on first-pass duration revealed a significant main effect of Valence, $F(2, 142) = 16.62$, $p < .001$, $\eta^2 = .19$, which was further qualified by a significant Valence $\times$ Group interaction, $F(4, 142) = 3.04$, $p = .019$, $\eta^2 = .079$. No significant main effect of Group was observed ($p = .22$).

To further explore the Valence $\times$ Group interaction, simple effects analyses were conducted to examine the effect of Valence within each group. A significant Valence effect was found for the DFSA group, $F(2, 36) = 13.40$, $p < .001$, $\eta^2 = .427$, and for the control group, $F(2, 68) = 3.91$, $p = .025$, $\eta^2 = .103$, but not for the non-DFSA group ($p = .14$). In the DFSA group, first-pass duration was significantly longer for threatening images compared to happy ($p < .001$) and neutral images ($p = .001$), and for happy images compared to neutral ones ($p = .003$). In the control group, first-pass duration was significantly longer for threatening images and happy images compared to neutral ones ($p = .007$ and $p < .001$, respectively); no differences were found between threatening and happy images ($p = .15$). See Figure 9.

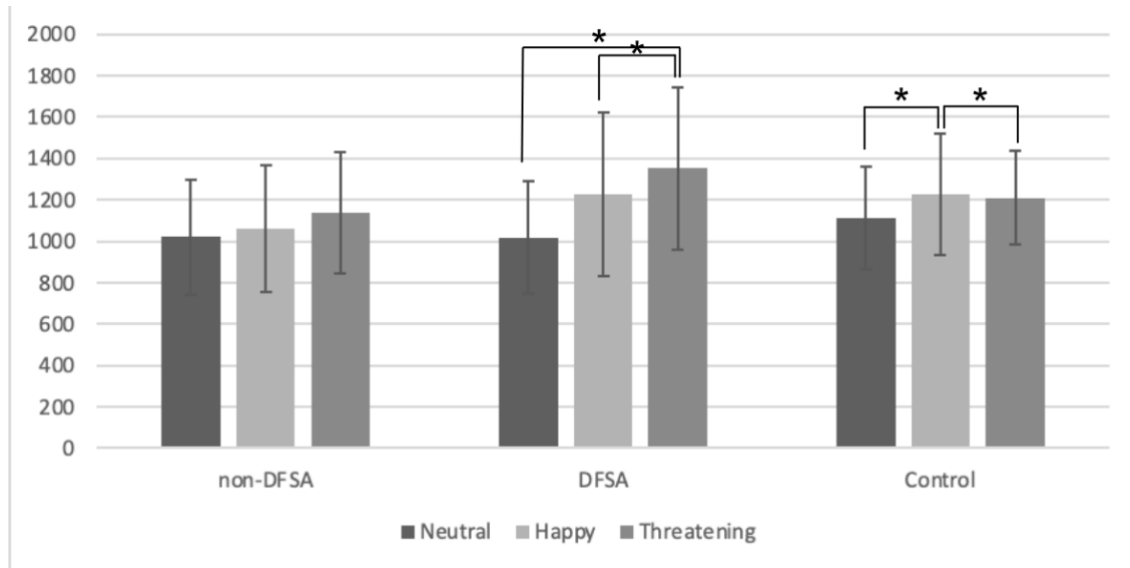


Figure 9. First-pass duration in each emotional valence for the non-DFSA group, the DFSA group, and the control group

Note: Bars represent mean values; error bars indicate the standard error of the mean. Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

3.3.4. Percentage of total duration

The ANOVA of the percentage of total duration revealed an effect of Valence, $F(2, 142) = 12.97, p < .001, \eta^2 = .154$, which was qualified by a Valence x Group interaction, $F(4, 142) = 2.73, p = .031, \eta^2 = .071$. No significant Group effect was found ($p = .19$).

To examine the Group x Valence interaction, we conducted simple effects tests of Valence for each Group. While a Valence effect was found for the DFSA group, $F(2, 36) = 12.78, p < .001, \eta^2 = .415$, and the control group, $F(2, 68) = 3.18, p = .048, \eta^2 = .085$, it was not found in the non-DFSA group ($p = .22$). In the DFSA group, the percentage of total duration was significantly longer for threatening images compared to happy ($p < .001$), no other differences were found (all $ps > .58$). In the control group, the percentage of total duration was significantly longer for happy images compared to neutral ones ($p < .001$). No other differences were found (all $ps > .27$). See Figure 10.

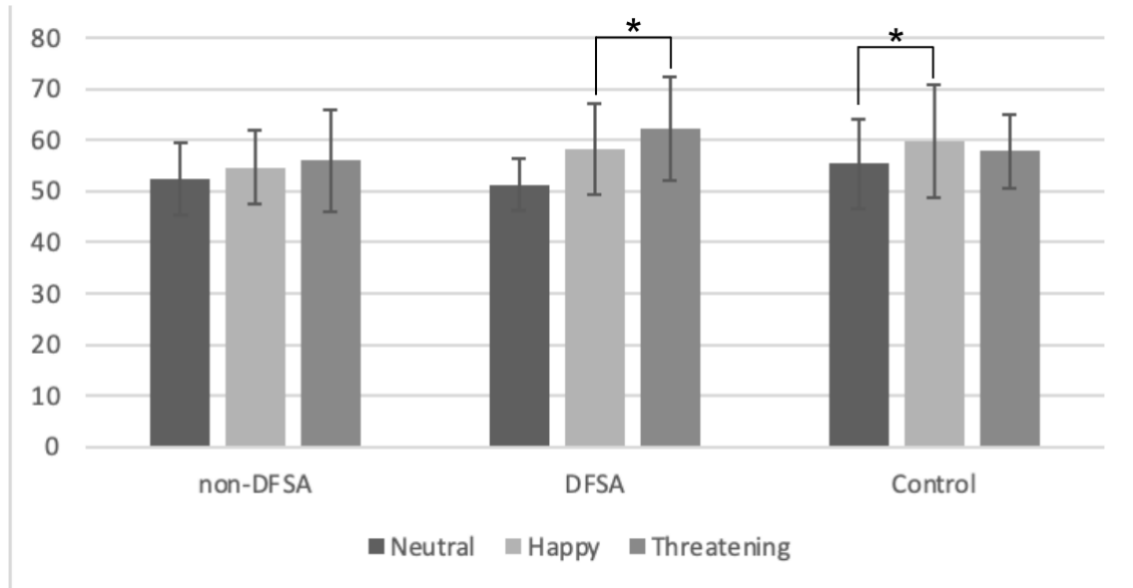


Figure 10. *Percentage of total duration in each emotional valence for the non-DFSA group, the DFSA group, and the control group*

Note: Bars represent mean values; error bars indicate the standard error of the mean. Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

3.3.5. Percentage of total fixations

The ANOVA of the percentage of total duration revealed an effect of Valence, $F(2, 142) = 14.62$, $p < .001$, $\eta^2 = .171$, which was qualified by a Valence x Group interaction, $F(4, 142) = 4.14$, $p = .003$, $\eta^2 = .104$. No significant Group effect was found ($p = .25$).

To examine the Group x Valence interaction, we conducted simple effects tests of Valence for each Group. While a Valence effect was found for the DFSA group, $F(2, 36) = 24.09$, $p < .001$, $\eta^2 = .572$, and the control group, $F(2, 68) = 3.51$, $p = .035$, $\eta^2 = .094$, it not found in the non-DFSA group ($p = .32$). In the DFSA group, the percentage of total fixations was significantly longer for threatening images compared to happy ($p < .001$), and neutral images ($p = .011$), and for happy images compared to neutral ones ($p = .018$). In the control group, the percentage of total duration was significantly longer for happy images compared to neutral ones ($p < .001$). No other differences were found (all $ps > .12$). See Figure 11.

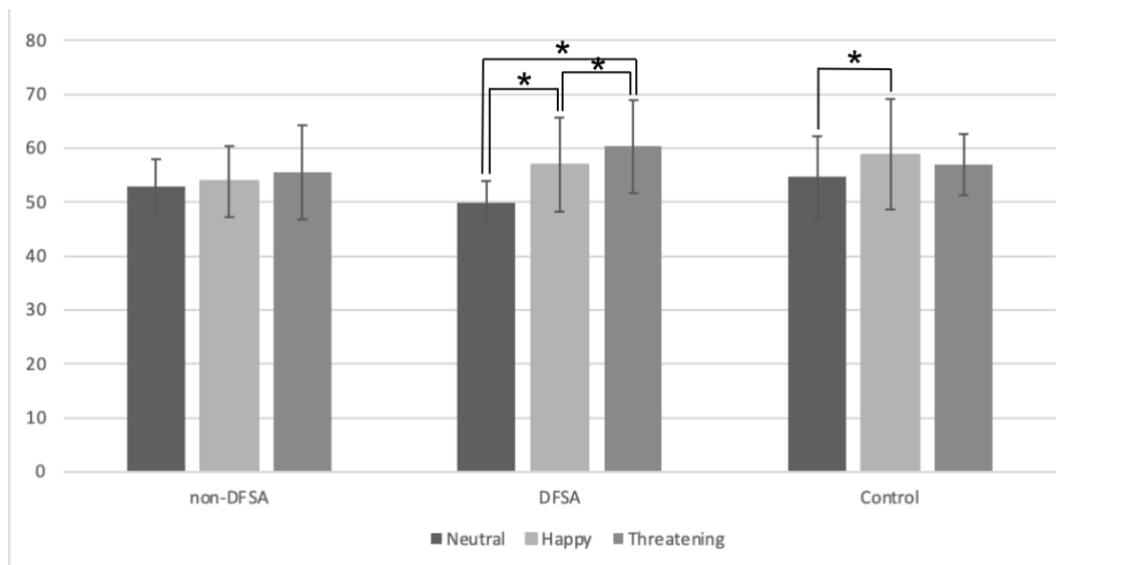


Figure 11. *Percentage of total duration of fixations in each emotional valence for the non-DFSA group, the DFSA group, and the control group*

Note: Bars represent mean values; error bars indicate the standard error of the mean. Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

3.3.6. Correlational analyses

Exploratory analyses conducted within the non-DFSA and DFSA groups examined the relationship between attentional outcomes and the severity of PTSD symptoms. A greater severity of avoidance symptoms was associated with reduced total fixation duration toward both threatening ($p = .041$) and happy images ($p = .010$). In contrast, greater severity of dissociative symptoms was linked to a higher percentage of total fixations on neutral images ($p = .043$). No other significant associations were observed (all $ps > .06$).

3.4. Objective 4- Attentional bias in a four-emotional stimuli free-viewing eye-tracking task

Descriptive data for all attentional indices are presented in Table 6.

Table 6. *Eye-Tracking Measures for Neutral, Happy, Threatening, and Sad Stimuli Across Each Group*

		Neutral	Happy	Threatening	Sad
Initial fixation latency (ms)	non-DFSA	3107,47(1614,96)	2415,83(1199,39)	2178(1370,48)	2488,18(1197,71)
	DFSA	3460,14(1268,22)	2559,55(1168,77)	2395,62(1353,99)	2492,06(912,03)
	Control	3633,97(1461,01)	2818,04(1282,61)	2998,97(1500,23)	2888,68(1161,79)
Initial fixation probability (%)	non-DFSA	23,75(9,07)	28,75(10,63)	25,42(8,62)	22,08(9,47)
	DFSA	21,49(8,01)	28,95(9,76)	22,81(9,14)	26,75(10,23)
	Control	21,32(11,24)	30,99(11,45)	22,69(10,74)	25(8,57)
First-pass duration (ms)	non-DFSA	990,29(674,8)	1328,52(619)	1474,67(993,86)	1564,74(913,45)
	DFSA	1185,34(665,26)	1597,85(918,55)	1474,43(559,84)	1605,67(906,57)
	Control	1446,84(814,5)	1970,6(942,83)	1805,19(872,97)	1976,10(1014,81)
Percentage of total duration (%)	non-DFSA	21,2(6,99)	27,64(7,88)	24,74(11,5)	26,49(5,08)
	DFSA	19,51(4,86)	23,61(5,78)	29,23(11,63)	28,39(3,52)
	Control	20,18(5,75)	30,99(8,18)	22,3(5,45)	26,64(5,2)
Percentage of total fixation (%)	non-DFSA	21,43(6,31)	27,85(6,2)	24,02(9,87)	26,72(4,16)
	DFSA	19,63(3,87)	25,25(5,95)	27,65(8,86)	28,09(2,55)
	Control	26,89(4,96)	30,68(7,82)	21,88(4,87)	26,89(4,96)

Note. Data are presented as means, with standard deviations shown in parentheses.

3.4.1. Initial fixation latency

A main effect of Valence was observed, $F(3, 213) = 27.08$, $p < .001$, $\eta^2 = .276$, indicating differences in the time to first fixation across emotional scenes. No significant effects emerged for Group or the Valence $\times$ Group interaction (all $ps = .25$).

3.4.2. Initial fixation probability

A main effect of Valence was also found for the probability of initial fixation, $F(3, 213) = 5.31$, $p = .002$, $\eta^2 = .070$. Participants showed a higher probability of

initially fixating on happy scenes compared to neutral ($p = .006$) or threatening scenes ($p = .031$). No interaction effects involving Group were found ($p = .71$).

3.4.3. First-pass duration

There was a significant main effect of Valence on first-pass duration, $F(3, 213) = 21.75$, $p < .001$, $\eta^2 = .235$, showing that first-pass durations were longer for emotional scenes compared to neutral ones (all $ps < .001$). No significant main effect of Group or Valence $\times$ Group interaction was found (all $ps > .09$).

3.4.4. Percentage of total duration

The ANOVA of the percentage of total duration revealed an effect of Valence, $F(3, 213) = 11.35$, $p < .001$, $\eta^2 = .138$, which was qualified by a Valence $\times$ Group interaction, $F(6, 213) = 3.89$, $p = .003$, $\eta^2 = .087$. No significant Group effect was found ($p = .37$).

To examine the Group $\times$ Valence interaction, we conducted simple effects tests of Group for each Valence. While a Group effect was found for happy images, $F(2, 73) = 5.93$, $p = .004$, and threatening ones, $F(2, 73) = 3.52$, $p = .035$, it was not found in sad and neutral images (all $ps > .37$). For happy images, the percentage of total duration was significantly shorter for the DFSA group compared to the control group ($p = .003$), no other differences were found (all $ps > .30$). For threatening images, the percentage of total duration was significantly longer for the DFSA group compared to the control group ($p = .029$), no other differences were found (all $ps > .39$). See Figure 12.

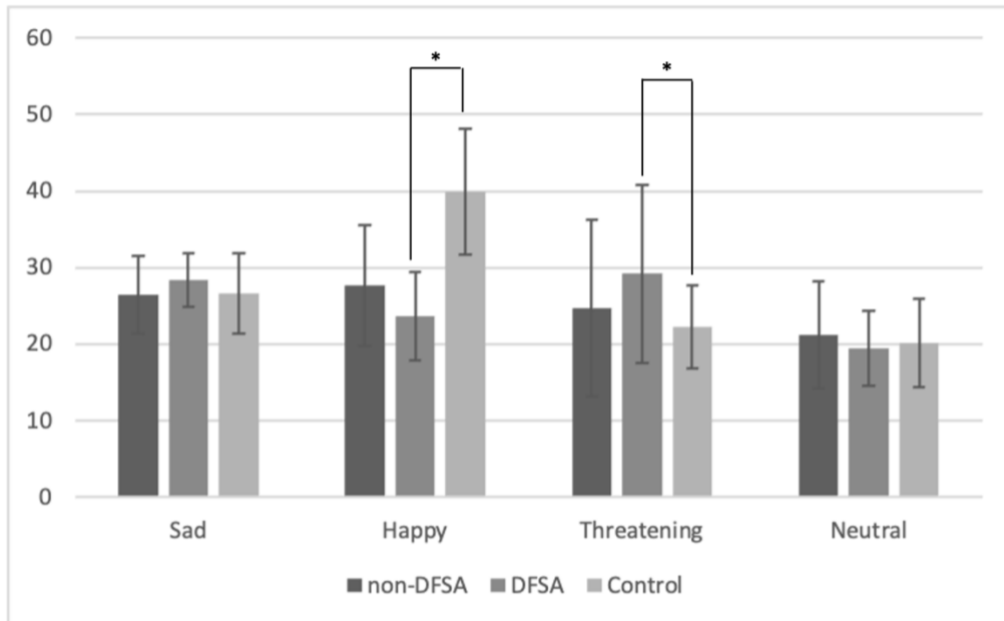


Figure 12. Bar graph showing group differences in percentage of total duration in each emotional valence

Note: Bars represent mean values; error bars indicate the standard error of the mean. Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

3.4.5. Percentage of total fixations

The ANOVA of the percentage of total fixations revealed an effect of Valence, $F(3, 213) = 15.43$, $p < .001$, $\eta^2 = .179$, which was qualified by a Valence x Group interaction, $F(6, 213) = 2.80$, $p = .012$, $\eta^2 = .073$. No significant Group effect was found ($p = .21$).

To examine the Group x Valence interaction, we conducted simple effects tests of Group for each Valence. While a Group effect was found for happy images, $F(2, 73) = 5.93$, $p = .004$, and threatening ones, $F(2, 73) = 3.52$, $p = .035$, it was not found in sad and neutral images (all $ps > .37$). For happy images, the percentage of total fixations was significantly lower for the DFSA group compared to the control group ($p = .019$), no other differences were found (all $ps > .42$). For threatening images, the percentage of total fixations was significantly higher for the DFSA group compared to the control group ($p = .028$), no other differences were found (all $ps > .41$). See Figure 13.

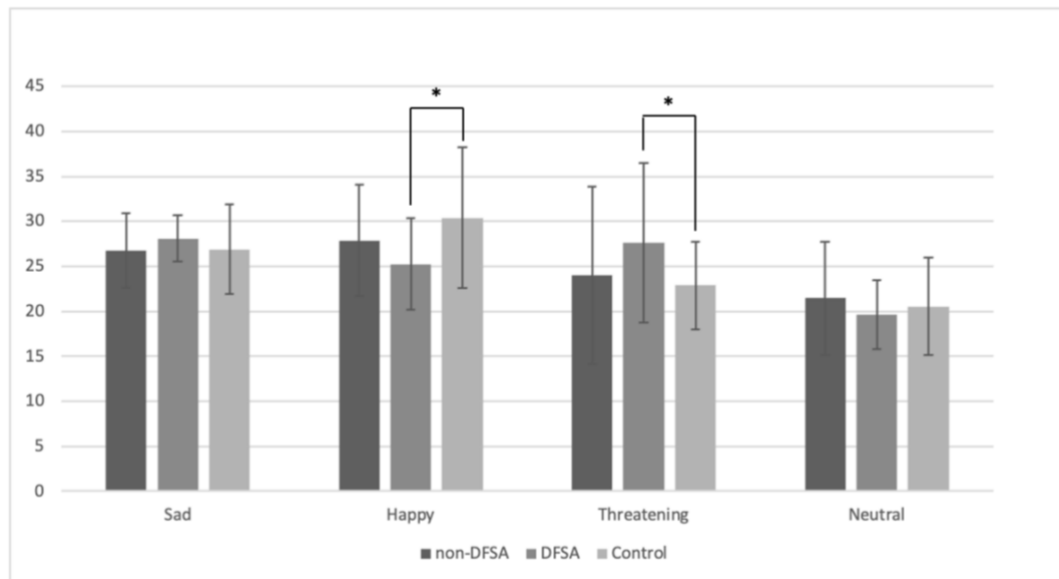


Figure 13. Bar graph showing group differences in percentage of total fixations in each emotional valence

Note: Bars represent mean values; error bars indicate the standard error of the mean. Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

3.4.6. Correlational analyses

Exploratory correlations within the SA and DFSA groups revealed that greater avoidance symptom severity was associated with a lower percentage of total fixations and shorter total duration to threatening stimuli ($p = .040$ and $p = .046$, respectively), but with longer total duration and a higher percentage of total fixations for happy stimuli ($p = .017$ and $p = .011$). In addition, higher dissociative symptom severity was related to a greater percentage of total duration and total fixations on neutral images ($p = .008$ and $p = .003$) and to a lower percentage of total fixations on threatening scenes ($p = .029$). No other significant associations were found (all $ps > .06$).

4. Discussion

4.1 Objective 1- PTSD and SF in DFSA and non-DFSA survivors

Firstly, we aimed to assess potential different patterns of PTSD symptomatology between DFSA and non-DFSA survivors, given that individual and contextual factors (i.e., substance use during the assault) exacerbate posttraumatic symptoms (Campbell et al., 2009). Additionally, we examined the post-assault SF and its association with PTSD symptoms. Our results pointed out that, although both survivor groups met diagnostic criteria for this disorder at similar rates, DFSA survivors consistently reported fewer and lower severity in specific symptom clusters, particularly reexperiencing, distress, and dissociation, and less severity of avoidance symptoms. Despite these differences in the manifestation of some PTSD clusters, both DFSA and non-DFSA survivors showed similar marked declines in sexual functioning across all domains (i.e., desire, pleasure, arousal, and orgasm). Notably, PTSD symptom severity, especially related to cognition, mood, and hyperarousal –which were presented at similar rates among the survivors– emerged as significant predictors of this deterioration.

Consistent with prior research (Kilpatrick et al., 2007; Littleton et al., 2009; Fields et al., 2022), both DFSA and non-DFSA survivors met PTSD criteria at comparable rates. This apparent similarity in prevalence may be explained by the use of global PTSD scores, which could obscure meaningful group differences at the level of specific symptom clusters. In line with Fields et al. (2022), who suggested that DF may exert a protective effect on certain PTSD dimensions—specifically, they reported reduced dissociative symptoms among a clinical sample of DFSA survivors—our study expands these findings by identifying lower levels of reexperiencing, distress, and avoidance clusters compared to the non-DFSA group. Notably, the similarities in our findings may be because Fields et al. (2022) examined a clinical sample with a mean age similar to ours, consisting of individuals receiving professional care. However, our further findings beyond dissociative symptoms may be explained by the fact that, although Fields et al. (2022) documented childhood, prior adult SA, and premorbid substance use

disorder, participants with pre-existing mental health conditions were not excluded. Certainly, incongruences in literature likely stem from methodological differences across studies in sample characteristics and the extent to which confounding variables were controlled. McConnell et al. (2017), Jaffe et al. (2017), Zinzow et al. (2010), and Peter-Hagene and Ullman (2018) relied on community samples, where individuals with heterogeneous trauma histories and varying levels of support may exhibit different symptom patterns. This distinction is crucial, as clinical populations may present more severe and persistent symptoms, influencing the way PTSD manifests. Additionally, age differences may have contributed to variability in findings, with samples ranging from 18–25 years (Jaffe et al., 2017; McConnell et al., 2020) and beyond 70 years (Peter-Hagene & Ullman, 2018; Zinzow et al., 2010). Moreover, individual risk factors were not consistently addressed across studies. For example, McConnell et al. (2017) did not account for trauma history, and Peter-Hagene and Ullman (2018) did not control for mental health conditions. Zinzow et al. (2010) allowed participants to be classified into multiple groups if they had experienced both DFSA and non-DFSA. Finally, although Jaffe et al. (2017) controlled for prior SA and time elapsed since the assault, they did not account for other traumatic experiences or pre-existing mental health conditions, limiting the interpretation of their results. By contrast, our study is the only one in which confounding variables, such as prior trauma, sexual revictimization, childhood SA, and pre-existing mental health conditions, were controlled, allowing us to isolate the specific impact of a recent SA on PTSD outcomes.

Concerning the SF and following our hypothesis, our findings reinforce the well-established association between SA and SF difficulties (Van Berlo & Ensink, 2000), revealing that survivors reported significant declines in sexual desire (frequency and intensity), pleasure, arousal, and orgasm compared, even when a DF has mediated the SA. This aligns with prior research indicating that SA survivors experience impairment in all areas of SF compared to individuals without a history of SA (Kelley & Gidycz, 2019; Turchik & Hassija, 2014). Importantly, our findings emphasize that DFSA survivors are not exempt from such difficulties despite their limited awareness or recall of the traumatic event.

Nevertheless, although the presence of SF impairment is common to non-DFSA and DFSA cases, the underlying cognitive and emotional mechanisms

may differ. In DFSA survivors, the impairment may be linked to confusion and uncertainty surrounding the assault, a perceived loss of control over their body and sexuality, and feelings of vulnerability resulting from impaired perceptual awareness. Additionally, cognitive distortions, such as attributions of personal responsibility or heightened self-blame for drinking to the point of impairment or incapacitation (Littleton et al., 2009; Macy et al., 2006; Peter-Hagene & Ullman, 2018; Testa et al., 2003; Tiihonen Möller et al., 2014), may underlie these difficulties. Conversely, for non-DFSA, these SF difficulties may be more related to the association of sexual activity with danger or coercion or feelings of guilt that can develop into self-recrimination when experiencing sexual arousal (Davis & Petretic-Jackson, 2000). Future research should explore which of these cognitive distortions and emotional symptoms mediate this association, providing further insight into the mechanisms underlying SF impairment in DFSA survivors.

Finally, unlike previous research that conceptualized PTSD categorically (Högbeck & Möller, 2022), our study underscores the importance of analyzing PTSD symptom clusters individually, given their distinct influence on SF outcomes. Consistent with prior research highlighting PTSD as a key mediator in the relationship between SA and SF difficulties (Letourneau et al., 1996; O'Driscoll & Flanagan, 2016), our results indicate that negative cognitions and mood, as well as hyperarousal symptoms, predicted SF deterioration in all SA survivors –note that these PTSD symptoms were comparable across our groups. Similarly, Schnurr et al. (2009) found that hyperarousal symptoms are mainly linked to reduced sexual satisfaction in female veterans; however, these participants potentially have had a large variety of trauma histories and also presented multiple mental health comorbidities. In contrast, our results reveal that, even after controlling for these factors, not only hyperarousal but also negative cognitions and mood were associated with SF deterioration, allowing for more specific conclusions regarding PTSD's role. One explanation may be that hyperarousal symptoms can interfere with focusing on pleasure and increase fear and threat perception, exacerbating pain during sex and reducing both desire and satisfaction. Additionally, negative cognitions and mood following SA may interfere with sexual pleasure and satisfaction (O'Driscoll and Flanagan, 2016). Further assessment of the basal arousal level, as well as the cognitive and mood

symptoms underlying this association, could expand our understanding of the issue and provide valuable insights for clinical interventions.

Despite the relevance of the findings obtained in this study, several limitations should be considered. The small sample size, resulting from the strict exclusion criteria, may have affected the statistical power and the generalizability of the results, considering that many SA survivors have a history of revictimization. However, precisely by applying these rigorous criteria, we obtained a highly specific sample, allowing us to isolate the impact of a recent SA without the influence of childhood SA, prior SA, or other traumatic events, thereby strengthening the study's internal validity. Another limitation is that SF measures were based on self-reports, which may be affected by memory biases or social desirability effects. However, we used a standardized and objective measure, ensuring that all participants provided comparable data across different groups. Furthermore, given the sensitive nature of sexual difficulties, self-reports remain one of the most widely used methods in research on SF, as they allow participants to express their experiences in a more personal and less intrusive manner than structured clinical interviews. Despite these limitations, the findings of this study provide new insights into the impact of DFSA on PTSD and SF with a novel design, which includes DFSA survivors as a distinct group, allowing for a direct examination of the effects of substance use on a recent and isolated SA while eliminating confounding factors such as other traumas or pre-existing mental disorders.

4.2. Objective 2- Psychopathological Sequelae and Emotional Regulation Difficulties in DFSA and Non-DFSA Survivors

To a broader assessment of post-assault mental health consequences after a DFSA and a non-DFSA, we explored several psychopathological symptoms beyond PTSD, and the potential impact of emotional dysregulation on its presentation. Although both non-DFSA and DFSA groups exhibit higher symptomatology than the control group in all areas, when SA groups were compared, non-DFSA survivors showed higher symptoms of anxiety and

psychoticism compared to DFSA ones. Regarding emotion regulation, non-DFSA survivors demonstrated worse emotional regulation than controls in all domains, whereas DFSA survivors only exhibited worse functioning in non-acceptance of emotional distress. Furthermore, emotional regulation difficulties —particularly non-acceptance of emotional distress and lack of emotional control— were identified as key predictors of anxiety and psychoticism in SA survivors. The following sections will provide a more in-depth discussion of each outcome.

In line with previous research documenting the psychological consequences of SA (Campbell et al., 2009; Dworkin et al., 2017), our findings reveal that both non-DFSA and DFSA survivors reported higher psychopathological symptoms than the control group across all domains assessed. Specifically, survivors of an SA experienced more symptoms of somatization, obsessive-compulsive tendencies, interpersonal sensitivity, anxiety, depression, hostility, phobic anxiety, paranoid ideation, and psychoticism than controls. Critically, when comparing both survivor groups, non-DFSA survivors exhibited significantly higher levels of anxiety—characterized by excessive worry and heightened physiological arousal—and psychoticism, which encompasses disorganized thinking and perceptual distortions. These results suggest that, despite comparable PTSD diagnosis rates across groups, the broader psychopathological impact of SA may be more severe among non-DFSA survivors—a distinction that could be obscured when focusing solely on PTSD outcomes (Dworkin et al., 2017). A potential explanation for this differential pattern is that DFSA survivors, due to the effects of substances during the assault, may experience impaired meaning-making or fragmented memory (Recalde-Esnoz et al., 2024), which could result in a less intense immediate emotional response. In contrast, non-DFSA survivors, who experience the assault without the mitigating effects of substances, may process it with full awareness, leading to a vivid, coherent encoding of the traumatic event. This heightened and coherent recollection may increase the emotional impact and contribute to a more intense and prolonged stress response, ultimately exacerbating symptoms such as anxiety and psychoticism. Taken together, these findings highlight the importance of broadening the scope of psychological outcomes beyond PTSD when examining the mental health consequences of SA (Dworkin et al., 2017), particularly in cases involving DS, as substance-induced

incapacitation and the consequent inability to consent may alter how trauma is processed and experienced over time, potentially leading to a distinct psychological profile that would be overlooked if only PTSD symptoms are assessed.

Concerning emotion regulation, non-DFSA survivors demonstrated widespread impairments across multiple domains—including confusion, inattention, non-acceptance of distress, and lack of emotional control—compared to the control group. In contrast, DFSA survivors only exhibited greater difficulties in non-acceptance of emotional distress, suggesting that distress intolerance may be a core regulatory challenge in SA survivors regardless of assault characteristics. The non-DFSA group's worse functioning across all domains, compared to the DFSA group, may be explained by differences in how each group processes the assault. Specifically, full awareness during a non-DFSA may overwhelm regulatory systems due to the vividness of the trauma and its associated affective load, leading to widespread disruption in emotion regulation processes. Meanwhile, DFSA survivors often experience difficulties accessing their trauma narratives and exhibit impaired meaning-making as a consequence of the substances, which might buffer certain aspects of emotional regulation, such as the acceptance and processing of trauma-related distress. Additionally, the particular circumstances of DFSA—where, along with the use of substances, it is often accompanied by stigma and victim-blaming attitudes (Littleton et al., 2009)—can amplify feelings of guilt, shame, and self-blame, further complicating the survivor's emotional processing. These intense negative emotions around DFSA may further contribute to a tendency to reject or avoid distress at similar levels to non-DFSA survivors, even in the absence of vivid traumatic memories. Thus, although other domains of emotion regulation remain relatively preserved in DFSA survivors, the difficulty in accepting emotional distress emerges as a central issue due to the dissonance between their fragmented traumatic experience and the need to integrate conflicting negative emotions. In conclusion, while full awareness during non-DFSA leads to broader regulatory impairments, the unique context of DFSA spares some domains yet leaves distress intolerance as a critical common deficit.

Finally, our results are aligned with previous research highlighting emotional dysregulation as a key predictor in psychological symptoms

development after an SA (Ullman et al., 2014). Specifically, our results point out that non-acceptance of emotional distress and lack of emotional control are predictors of anxious and psychotic symptoms after an SA. One explanation for this is that non-acceptance of negative emotions may involve maladaptive coping strategies (e.g., rumination or suppression), which in turn heighten anxiety by increasing physiological arousal and stress responses. Consequently, when negative emotions are rejected rather than processed over time, they may accumulate and manifest as intrusive thoughts, confusion, or dissociative experiences, increasing vulnerability to symptoms like disorganized thinking and perceptual distortions. Simultaneously, a lack of emotional control—often characterized by impulsivity and difficulty managing intense emotions—can heighten emotional reactivity and increase anxiety symptoms by impairing the survivor's ability to regulate emotional and physiological responses to stress. Without effective regulation, negative emotions can escalate rapidly, amplifying arousal and worry, which in turn reinforces anxious states. Moreover, impulsivity may destabilize cognitive functioning, contributing to psychotic-like symptoms such as fragmented thinking and perceptual distortions. Therefore, the interaction between these factors suggests that survivors with difficulties in accepting emotional distress—both DFSA and non-DFSA ones— while also lacking emotional control, may experience a compounded effect, where persistent anxiety exacerbates cognitive instability, increasing the risk of psychotic-like experiences. For its part, Ullman et al. (2014) concluded that emotional dysregulation is a predictor factor for developing PTSD and depressive symptoms in a women's community sample with a history of SA. Despite these valuable findings, the inclusion of participants with prior trauma histories may have confounded the results, making it difficult to isolate the specific impact of the assault in question. Furthermore, the study did not explore the specific impact of distinct emotional regulation domains on mental health outcomes, as it is solely focused on depression and PTSD, overlooking the broader spectrum of psychological difficulties that survivors of SA may experience. Taken together, our findings underscore the importance of examining nuanced dimensions of emotional regulation and their unique contributions to diverse psychological outcomes in both DFSA and non-DFSA survivors.

Despite these interesting results, our study has several limitations. Although the strict exclusion criteria led to a small sample size, potentially limiting the generalizability of the findings—especially given the high prevalence of revictimization among SA survivors—these criteria also allowed for a highly specific sample. By excluding individuals with histories of childhood or prior adult SA together with other traumatic experiences, the study was able to isolate the effects of a recent SA—particularly in cases involving DFSA—thereby enhancing its internal validity and enlarging the knowledge about this under-researched population. This approach enables a more direct examination of the effects of substance involvement in recent, isolated SA cases while controlling for confounding factors such as prior trauma or pre-existing mental health conditions. Another limitation is that psychological symptoms and emotional dysregulation were assessed through self-reports, which may be subject to social desirability effects. Nevertheless, we employed standardized and validated measures, ensuring consistency in responses across participant groups. Despite these limitations, this study offers valuable insights into the impact of DF on survivors' mental conditions, employing a novel design that considers DFSA survivors as a distinct group. Unlike prior research that has primarily focused on PTSD and depression, we explored a wider spectrum of psychological symptoms offering a more comprehensive picture of survivors' mental health. Furthermore, rather than assessing overall emotional dysregulation as a single, global construct, we investigated specific domains of emotional regulation and analyzed how each of them relates to different psychological outcomes. This approach strengthens the specificity of our findings and provides valuable insight into the mechanisms linking emotional dysregulation with mental health conditions following SA.

4.3 Objective 3- Attentional bias in a two-emotional stimuli free-viewing eye-tracking task

This is the first study to investigate attentional biases during naturalistic free-viewing of socio-emotional stimuli (i.e., threatening, happy, and neutral scenes) presented in competition with non-social stimuli among survivors of DFSA and non-DFSA. The results provide converging evidence for emotion-

dependent attentional modulation shaped by group differences. Specifically, DFSA survivors exhibited both engagement and sustained attentional biases toward threatening scenes, followed by happy scenes, with comparatively less attention to neutral ones. In contrast, the non-DFSA group showed no attentional bias based on emotional valence. For the control group, although threatening and happy scenes elicited greater attentional engagement than neutral ones, sustained attention was predominantly directed toward happy scenes. Hence, these group-specific patterns were not attributable to differences in initial orienting. Finally, exploratory correlational analyses revealed that greater avoidance symptom severity was associated with reduced total fixation duration on both threatening and happy stimuli, whereas higher dissociative symptomatology was linked to increased fixation frequency on neutral stimuli. These findings highlight the differential contribution of specific PTSD symptom dimensions to attentional processing and underscore the importance of considering SA typology in trauma research.

Contrary to our initial hypotheses based on the inaccessibility of traumatic memory studies (McNally et al., 2000), the findings from this first eye-tracking study revealed a distinct attentional pattern among DFSA and non-DFSA survivors. Specifically, unlike their non-DFSA counterparts, DFSA survivors exhibited an attentional bias toward threatening scenes compared to happy and neutral ones. This attentional pattern may reflect the broader clinical complexity characterizing DFSA experiences. These assaults, in addition to the amnesia regarding the event, often involve a lack of a coherent trauma narrative, profound disruption of perceptual awareness, a perceived loss of control over one's body, and persistent uncertainty regarding what occurred during the event (see Saint-Martin et al. 2006 for a review). Such conditions may hinder the integration of the trauma and contribute to a sustained state of hypervigilance. Within this context, the attentional bias toward threatening stimuli may reflect a threat-monitoring mechanism, whereby ambiguous or socially charged cues (even if not explicitly sexual) gain emotional salience due to their resonance with the unresolved and disorienting features of the traumatic experience (Busardò et al., 2019). In contrast, while the control group displays the expected pattern of attentional engagement with emotional stimuli and sustained attention to positive content—indicative of intact emotional processing—the absence of emotion-dependent

attentional modulation in the non-DFSA group may point to a disruption in these normative processes, potentially reflecting affective blunting or reduced emotional responsiveness following trauma. Supporting this interpretation, prior research has identified attentional distraction as a common strategy among trauma survivors to manage overwhelming emotional content (Cisler & Koster, 2010). Alternatively, the lack of attentional bias in the non-DFSA group may be attributed to the limited sexual trauma relevance of the socio-emotional scenes used in the present study. That is, although the stimuli represented scenes with threatening valence, they did not explicitly depict sexual violence and may not have been sufficiently specific or personally meaningful to evoke trauma-related processing in this group. In line with this, Pineles et al. (2009) found that SA survivors exhibited no attentional bias when exposed to general threat cues, highlighting the importance of stimulus specificity in triggering trauma-related attentional processes. Consistent with this view, previous research employing a different methodology and stimuli that more directly reflect the content of sexual trauma, such as words or images with sexual threat connotations, has reported stronger attentional biases in similar samples (Cassiday et al., 1992; Fleurkens et al., 2011; Foa et al., 1991; Martinson et al., 2013). Taken together, these findings suggest that attentional biases in non-DFSA survivors may be more likely to emerge when the emotional content of the stimuli closely aligns with the specific nature of their traumatic experience.

Regarding the stages of attentional processing, no differences between the groups were observed during the initial orienting stage, suggesting that early automatic attentional processes may not be significantly disrupted by trauma-related processes. One possible explanation is that the complex socio-emotional scenes used in this study— as opposed to isolated words or facial expressions employed in other studies—required a rapid visual scanning of the scene before selectively engaging with a specific image, thereby limiting early attentional modulation (Lazarov et al., 2019). In contrast, differences emerged during later stages, specifically engagement and sustained attention, which rely more heavily on controlled and voluntary processes. These stages are more susceptible to being affected by trauma-related difficulties in emotion regulation and attentional control (Gauntlett-Gilbert et al., 2004; Klanecky Earl et al., 2020). These findings are consistent with prior studies reporting that attentional biases in trauma-

exposed individuals often manifest during sustained rather than early attention (Lazarov et al., 2019; Lee & Lee, 2012, 2014). In the case of DFSA survivors, the sustained attention to threat may be driven by the uncertainty and fragmented recall associated with the assault (Thompson, 2021), which could increase rumination and perseverative thinking, making it harder to disengage from threat-related cues (Lazarov et al., 2019). Conversely, the absence of attentional modulation among non-DFSA survivors across stages may reflect a different trajectory of trauma processing and psychological profile, likely related to greater acknowledgment and lower uncertainty surrounding the event (Zinzow et al., 2010). These results suggest that controlled attentional patterns are shaped not only by trauma-related processes but also by the emotional valence of social scenes.

Importantly, this study contributes novel insights by examining the relationship between specific PTSD symptom clusters and attentional processing, an approach rarely addressed in previous eye-tracking studies, which assessed PTSD categorically (Lazarov et al., 2019; Lee & Lee, 2012, 2014). Prior studies found an association between overall PTSD and attentional bias toward threat-related stimuli, although mostly focused on individuals whose trauma occurred during childhood or in the distant past. This may limit the detection of certain PTSD symptoms, such as avoidance or dissociation, that often emerge more prominently in the acute aftermath of trauma and may exert differential effects on attentional patterns. Our findings reveal that individuals with recent SA and elevated avoidance tendencies tend to fixate less on emotionally salient information —possibly reflecting an attempt to suppress or distance from emotionally salient material, consistent with Emotional Processing Theory (Foa et al., 2007). In contrast, higher levels of dissociative symptoms are associated with increased attention to neutral stimuli, likely reflecting disruptions in perceptual integration and reduced responsiveness to affective information (American Psychiatric Association, 2013; Herzog et al., 2019). Notably, these PTSD symptoms were more salient among non-DFSA participants than in DFSA ones, which may also explain the differences in attentional biases observed between the two groups. These findings extend previous research by indicating that dissociative symptoms diminish responsiveness to emotionally charged cues (Herzog et al., 2019). Hence, the attentional shift away from emotionally charged

toward neutral content may reflect both a specific psychological profile and a protective coping strategy present in non-DFSA survivors, allowing them to reduce the exposure to affectively overwhelming stimuli (Herzog et al., 2019; Lanius et al., 2010).

Several study limitations must be noted. One of these limitations is the small sample size, which resulted from the strict exclusion criteria and the fact that the sample was composed exclusively of women, potentially limiting the generalizability of the findings. However, studies using similar populations and methodologies typically rely on small sample sizes and predominantly female participants (Lazarov et al., 2019; Lee & Lee, 2014), likely reflecting the fact that sexual violence is a social issue that disproportionately affects women (Garcia-Moreno et al., 2005). Nevertheless, by excluding individuals with histories of childhood or prior adult SA, together with other traumatic experiences and mental health conditions, the study was able to isolate the effects of a recent SA, particularly in cases involving DFSA, without the confounding influence of trauma chronicity or cumulative exposure. This methodological decision enhances the internal validity and enlarges the knowledge about this under-researched population. Another potential limitation concerns the nature of the visual stimuli. While the use of non-sexual emotional images was intentional to avoid participant discomfort and the risk of trauma-specific reactivity, these stimuli may not evoke the same trauma-related reactions as content more closely tied to the context of the assault. Nonetheless, it is important to note that one of the objectives of the present study was to examine attentional bias among DFSA survivors (i.e., with high uncertainty and lack of a clear narrative about their traumatic event); therefore, specific trauma-related stimuli may not be meaningfully connected to the individual's subjective experience. In this context, the use of more general emotional stimuli allowed for a controlled assessment of threat sensitivity without triggering trauma-specific reactivity that may not be uniformly processed across participants. Additionally, this design also enhances ecological validity by reflecting real-world attentional demands, where individuals must process and prioritize complex, socially relevant information in dynamic environments. Lastly, although this study may suggest that attentional differences in the DFSA group may be attributed to the absence of clear memories of the assault, we conducted an additional analysis including participants' memory clarity as an independent

variable. This variable did not yield significant effects in any of the eye-tracking outcomes (all $F_s < 1$), suggesting that memory clarity alone does not account for the observed attentional patterns.

Despite its limitations, the present study presents several methodological strengths. While many previous investigations have yielded valuable insights using community samples and traditional attentional tasks such as the Stroop or dot-probe paradigms (Foa et al., 1991; Martinson et al., 2013; Cassiday et al., 1992; Fleurkens et al., 2011; McNally et al., 2000; Hirai et al., 2022), the present study contributes to the existing knowledge by employing both a highly specific clinical sample and eye-tracking methodology. This combination enhances the clinical relevance of the findings and allows for a temporally fine-grained examination of attentional processing across its different phases (i.e., initial orienting, engagement, and sustained attention), offering a more nuanced understanding of trauma-related cognitive underlying mechanisms. Finally, assessing PTSD symptoms dimensionally, rather than categorically or divided into higher or lower levels (Lee & Lee, 2014), enabled a more detailed examination of how specific symptom clusters relate to attentional biases, offering insights that may be obscured in dichotomous diagnostic approaches.

4.4. Objective 4- Attentional bias in a four-emotional stimuli free-viewing eye-tracking task

To the best of our knowledge, this is the first study to examine attentional biases during naturalistic free-viewing of socio-emotional stimuli (i.e., happy, sad, threatening, and neutral scenes) presented in competition among survivors of DFSA and non-DFSA. The main findings of this study can be summarized as follows: regarding the initial orienting, all participants were more likely to direct their first fixation toward happy scenes, while all emotional stimuli were fixated more quickly than neutral ones. Additionally, emotional stimuli also received a longer first-pass duration. Critically, differences between the groups emerged during later stages. Specifically, DFSA survivors showed greater sustained attention (i.e., greater percentage of total duration and fixations) to threatening stimuli compared to non-DFSA survivors and controls. Moreover, the DFSA group exhibited lower sustained attention toward happy scenes compared to the

other groups. Finally, exploratory correlational analyses with PTSD symptoms revealed that greater severity of avoidance was associated with reduced sustained attention to threatening stimuli and increased sustained attention to happy ones. In contrast, higher levels of dissociative symptomatology were linked to increased sustained attention to neutral stimuli and fewer total fixations on threatening stimuli.

Regarding attentional processing in a task with greater ecological validity, the present study revealed differential patterns in how survivors of DFSA and non-DFSA allocated attention to simultaneously presented emotional stimuli. DFSA survivors—unlike their non-DFSA counterparts and non-exposed controls—exhibited an attentional bias toward threatening scenes and away from happy ones. This may reflect, once again, the unique psychological characteristics of DFSA experiences, characterized by inability to consent, lack of a coherent trauma narrative, and significant uncertainty about what occurred during the assault, which potentially compromises trauma integration and the subsequent emotional regulation and processing (see Saint-Martin et al., 2006 for a review). Notably, contrary to what has been observed in individuals with childhood trauma histories, where memory processing appears to influence attentional patterns (McNally et al., 2000), our findings did not support memory clarity as a significant key factor, as analyses controlling for recall levels (i.e., none, partial, or full) revealed no significant effects. Interestingly, the attentional biases in the DFSA group were similar to those of women with IPV (Lee and Lee, 2012), with both groups showing an attentional bias toward threat cues, suggesting the presence of a heightened protective mechanism, following covert interpersonal betrayal where the threat is not easily identifiable. Moreover, an attentional bias away from happy scenes may suggest a reduced focus on seeking rewarding experiences. However, only IPV survivors demonstrate increased dwell time on sad scenes, which may reflect an elaborative, rumination-linked processing of negative affect characteristic of chronic trauma. Critically, non-DFSA survivors did not show attentional biases toward any specific emotional content, suggesting possible affective blunting or attentional avoidance to dampen emotional arousal (Cisler & Koster, 2010). Alternatively, because threats in non-DFSA assaults are usually easily identifiable, attentional biases in

this group may only emerge in the presence of sexually explicit cues (Pineles et al., 2009).

Regarding the stages of attentional processing, aligned with our results of the first eye-tracking task, the present study expand the findings revealing that, also during longer presentations of the stimuli (i.e., 20 seconds), attentional biases appear during more controlled phases of attention (such as sustained attention), rather than during the initial, automatic orienting phase. This pattern is also consistent with the notion that controlled, voluntary attentional processes are more strongly influenced by trauma-related psychopathology, whereas early orienting tends to depend more on the inherent salience and characteristics of the stimuli themselves (Armstrong et al., 2013; Eysenck et al., 2007). An alternative explanation could be related to the specific features of our task design, which presented participants with complex scenes and four images simultaneously, potentially diluting the impact of any single stimulus during early orienting. However, we consider this explanation less plausible given that Lee and Lee, who had presented a similar task in a sample of IPV survivors (Lee and Lee, 2012), designed a simplified version to specifically assess initial orienting, using only two facial expressions (one emotional vs. one neutral) (Lee and Lee, 2014). Despite this targeted design, they found no group differences in initial orienting; attentional biases only emerged during later stages, reinforcing the idea that trauma-related attentional alterations are more evident in controlled rather than automatic processes. This pattern may reflect disruptions in emotion regulation and attentional control among survivors (Gauntlett-Gilbert et al., 2004; Klanecky Earl et al., 2020).

Lastly, our findings highlight that different PTSD symptom clusters can shape attentional processing of emotional information. Specifically, among participants who experienced a SA, those reporting higher avoidance symptoms showed reduced attention to threatening scenes and greater attention to happy ones. Similarly, elevated dissociative symptoms were associated with increased attention to neutral stimuli and diminished attention to threatening scenes. Notably, these symptom-related patterns were more pronounced among non-DFSA survivors than DFSA survivors, which may partly explain the group differences in attentional biases. The present results are consistent with Emotional Processing Theory (Foa et al., 2007), which posits that avoiding

trauma-related external cues can help reduce emotional distress. Thus, the tendency of non-DFSA survivors with high avoidance to direct attention away from threatening scenes but toward positively valenced stimuli may reflect an attempt to counteract the affective burden of a vividly remembered trauma. Likewise, the association between dissociation and increased focus on neutral content aligns with the notion that dissociative states involve altered perceptual integration and reduced awareness of emotionally salient cues (APA, 2013). This supports evidence that dissociation can dampen responsiveness to emotional stimuli (Herzog et al., 2019), highlighting a distinct attentional strategy that may function as a protective buffer against overwhelming affect (Lanius et al., 2010; Herzog et al., 2019). Additionally, considering that both our groups (DFSA and non-DFSA survivors) showed comparable rates of PTSD diagnosis, our findings extend previous research by moving beyond categorical approaches and highlighting how specific PTSD symptom clusters can differentially shape attentional processing of emotional information. Prior studies have typically linked the presence of PTSD—as a single diagnostic entity—to attentional biases toward threatening cues (e.g., Lazarov et al., 2019; Lee & Lee, 2012, 2014). However, treating PTSD as a unitary category may mask the unique ways in which distinct symptom dimensions, such as avoidance or dissociation, affect attentional patterns, particularly in the acute phase after trauma when these symptoms tend to be most prominent. Taken together, these results underscore the importance of examining PTSD at the symptom cluster level to better capture how different facets of posttraumatic stress influence attentional processes to emotionally salient cues.

Despite these important findings, several methodological considerations that limit the generality of the conclusions should be acknowledged. First, the relatively small sample size resulted from the decision to exclude individuals with histories of childhood or prior adult SA, other traumatic events, or comorbid mental health conditions, which was designed to ensure a highly specific sample and to isolate the effect of DFSA, without the confounding influence of trauma chronicity or cumulative exposure. This methodological choice enhances the specificity of the findings and contributes novel evidence about an under-researched group. Nevertheless, although this limited the number of eligible participants, it aligns with previous research using similar experimental designs

and populations, where a small sample size is common (Lee & Lee, 2012, 2014). Second, the study exclusively included female participants, which could limit the generalizability of the findings to other populations. However, this focus was intentional and appropriate, given that sexual violence remains a gendered phenomenon that disproportionately affects women worldwide (Garcia-Moreno et al., 2005). Focusing on women allowed us to examine a population at higher risk, providing more nuanced insights into the psychological impact of SA. Another consideration is the use of non-sexual emotional images, which might not directly elicit trauma-specific responses. However, this was an intentional decision to avoid unnecessary distress while addressing one of the core aims of the study: to explore attentional bias in DFSA survivors whose traumatic experiences often involve ambiguity in their lived experiences. In this context, highly specific trauma cues might not meaningfully capture their subjective experience. Finally, although the simultaneous presentation of complex emotional scenes may limit the detection of subtle early orienting effects, it was deliberately chosen to enhance ecological validity.

Beyond its limitations, this study boasts notable methodological strengths. Building on the valuable insights provided by prior research using community samples of SA survivors and well-established attentional tasks such as the Stroop and dot-probe paradigms (Cassiday et al., 1992; Fleurkens et al., 2011; Foa et al., 1991; Hirai et al., 2022; Martinson et al., 2013; McNally et al., 2000), this research uniquely combines a well-defined clinical sample with eye-tracking technology. This approach not only increases the clinical relevance of the findings but also provides a detailed temporal analysis of attentional processes across stages such as initial orienting, engagement, and sustained attention. Crucially, the task's design, presenting multiple emotional stimuli simultaneously, reflects real-world conditions where various emotional cues compete for attention. This design more closely approximates real-life conditions, where survivors must navigate environments filled with multiple competing emotional cues and manage limited attentional resources accordingly. Additionally, by evaluating PTSD symptoms dimensionally rather than categorically (Lee & Lee, 2014), the study captures more nuanced relationships between specific symptom clusters and attentional biases that categorical methods might overlook.

General Discussion

SA constitutes one of the most traumatic experiences with the greatest impact on mental health, affecting multiple areas of survivors' lives (Campbell et al., 2009; Dworkin et al., 2017). However, research has traditionally focused on PTSD as the main consequence (Dworkin et al., 2017), largely approached from a categorical perspective that classifies survivors based on the presence or absence of a diagnosis. Although useful for determining prevalence, this model is limited because it conceals symptomatic heterogeneity and the specificity of clinical profiles associated with different types of SA. The findings of this thesis support the need for a paradigm shift toward a dimensional and transdiagnostic approach, which enables the exploration of severity, frequency, and combination of symptoms, as well as their connections with other areas of psychological and social functioning. In addition to self-report measures, which are essential for capturing the diversity of survivors' symptomatology, it is also necessary to investigate the emotional and cognitive mechanisms underlying these symptoms (Latack et al., 2017) through objective and precise methods, such as eye-tracking, which allow for the assessment of attentional and affective processes that remain inaccessible to verbalization.

From this perspective, our results reveal that, although PTSD diagnostic rates were comparable between DFSA and non-DFSA, the symptomatic profiles differed significantly. Compared to other groups, DFSA survivors presented both a reduced number and lower intensity of symptoms related to intrusion, avoidance, dissociation, and subjective distress. These differences can be understood in light of the phenomenological characteristics of the traumatic experience. In DFSA, the involved substances generate confusion, loss of consciousness, and a fragmented narrative of the event (Gauntlett-Gilbert et al., 2004; Saint-Martin et al., 2006), which seems to attenuate certain symptoms linked to intrusive recall and avoidance, while at the same time introducing elements of confusion and uncertainty. By contrast, in non-DFSA, the experience in full awareness and the coherent narrative of the assault intensify the emotional encoding of the event, leading to greater intrusion and, as a counterpart, stronger avoidance and dissociation as defensive mechanisms. This evidence supports the view that PTSD cannot be conceived as a uniform entity, but as a

multidimensional construct whose expression varies according to the nature of the trauma and the way it is processed. It is important to consider that the diagnostic criteria for PTSD were originally designed for war-related or natural disaster trauma and do not fully capture the effects of interpersonal trauma, where the perpetrator's intentionality, relational damage, and feelings of betrayal generate specific consequences that transcend the boundaries of a single disorder (Brewin et al., 2025; Bryant, 2019).

Therefore, beyond PTSD, this work provides clear evidence of the need to broaden the focus towards transdiagnostic symptoms. Analysis using the SCL-90-R showed that both DFSA and non-DFSA survivors presented higher symptomatology than controls in multiple domains (somatization, depression, hostility, interpersonal sensitivity, phobia, paranoid ideation), reflecting the breadth of the psychopathological impact. Critically, the most marked differences among clinical groups were observed in anxiety and psychoticism, which were significantly higher in non-DFSA. These findings suggest that although PTSD is highly prevalent, other clinical manifestations, such as generalized anxiety or subclinical psychotic symptoms, may have equal or greater functional relevance for survivors' adaptation, regardless of the presence of DF.

Emotional dysregulation constitutes another key dimension for understanding these transdiagnostic consequences (Ullman et al., 2014). Results showed that non-DFSA survivors presented generalized deficits across multiple regulatory domains (confusion, inattention, lack of control, interference, and non-acceptance of distress), whereas DFSA survivors showed a more restricted profile, centered on intolerance of emotional distress. Again, this difference appears to be related to how the traumatic experience is processed: full awareness during the assault in non-DFSA may overwhelm regulatory systems, whereas in DFSA, the confusion and ambiguity prevent the elaboration of coherent narratives that integrate emotion, thereby fostering avoidance of distress. Dysregulation, particularly non-acceptance of distress and lack of control, was associated with greater anxiety and psychotic symptoms, reinforcing its role as a transdiagnostic mechanism linking SA to multiple psychopathological trajectories (Ullman et al., 2014).

Sexuality after the SA emerges in this context as a particularly vulnerable area. Despite the differences observed in other domains, with non-DFSA

survivors generally showing greater impairment, our results reveal that SF is similarly affected across both groups. Our results show that both DFSA and non-DFSA survivors experience significant impairments in desire, pleasure, arousal, and orgasm. This confirms the hypothesis that sexual trauma, due to its intimate and bodily nature, has a direct and specific impact on sexual experience (Van Berlo & Ensink, 2000; Turchik & Hassija, 2014). However, the mechanisms underlying these difficulties appear to differ. In DFSA, loss of bodily control, inability to process the event, and attributions of guilt related to substance use are associated with feelings of vulnerability and distrust toward one's own sexuality (Littleton et al., 2009; Testa et al., 2003). In non-DFSA, the problem seems to stem from the direct association between sex and danger, where arousal may evoke the episodes of coercion and trigger responses of guilt and rejection of one's own desire (Davis & Petretic-Jackson, 2000). Despite these differences, in both groups, hyperarousal symptoms, and negative cognitions and mood predicted sexual impairment, suggesting that common mechanisms, together with specific processes, contribute to explaining sexual dysfunction following assault.

Taken together, this thesis highlights that the consequences of SA cannot be reduced to the presence or absence of a PTSD diagnosis. The findings underscore the need to differentiate between DFSA and non-DFSA, as psychopathological trajectories differ in their symptomatic expression, regulatory mechanisms involved, and functional impact. While both groups exhibited similar rates of PTSD, sexual dysfunction, non-acceptance of distress, anxiety, and psychoticism, non-DFSA survivors displayed more generalized emotional dysregulation and broader psychopathological profiles. From a theoretical standpoint, these results reinforce the relevance of a dimensional and transdiagnostic framework, one that integrates diverse symptom domains and elucidates their interaction within contexts of interpersonal trauma.

These findings obtained through self-report measures are essential for understanding the psychopathological, emotional, and interpersonal consequences in survivors of SA; however, they need to be complemented by the study of basic cognitive processes involved in emotional information processing (Latack et al., 2017). These processes capture dimensions of trauma impact that often remain inaccessible to verbalization, which is particularly

relevant for survivors with fragmented or incomplete narratives, such as those of DFSA. In this regard, eye-tracking provides an objective and precise tool to assess attentional dynamics (Skinner et al., 2018), adding complementary information to self-reports. The convergence of these approaches highlights the importance of a multimodal model capable of uncovering mechanisms that underlie the interaction between cognition, emotion, and sexual dysfunction after assault. Our findings reveal a differential attentional pattern: DFSA survivors show sustained attention toward threatening stimuli and reduced attention to positive ones, whereas non-DFSA survivors display an absence of emotional modulation, with no clear bias toward threatening or pleasant stimuli. These differences suggest that underlying attentional mechanisms are specific to the type of assault and provide complementary information to self-reports. Threat fixation in DFSA reflects an alert system linked to uncertainty and ambiguity, maintaining the person in a state of constant awareness that hinders emotional regulation and makes it difficult to experience sexual satisfaction. In contrast, the emotional disengagement observed in non-DFSA may reflect avoidance and dissociation strategies to cope with intense and vivid traumatic episodes, which in turn can affect emotional regulation and sexual interactions. Moreover, exploratory correlations show that the severity of avoidance symptoms is associated with reduced attention to threatening stimuli, whereas dissociative symptoms are linked to increased attention to neutral stimuli. Notably, these symptoms are more severe in non-DFSA survivors compared to DFSA survivors. This pattern underscores how distinct dimensions of post-traumatic psychopathology are differentially shaped by attentional processes.

Overall, these results highlight the need for a dimensional and transdiagnostic model that integrates both symptomatic expression and underlying cognitive-emotional processes, including attentional dynamics revealed through eye-tracking, fostering a more comprehensive understanding and more tailored treatment of the psychological consequences of SA. By incorporating eye-tracking data, this framework captures cognitive-emotional patterns that complement self-reports, revealing mechanisms such as threat fixation in DFSA and emotional disengagement in non-DFSA, which contribute to differences in post-traumatic consequences.

Limitations and strengths

Despite the relevance of the findings, several limitations should be acknowledged. The most important aspect refers to the relatively small sample size, which resulted from the strict exclusion criteria applied and the exclusive inclusion of women. However, studies using similar populations and methodologies typically rely on small sample sizes and predominantly female participants (Lazarov et al., 2019; Lee & Lee, 2014), likely reflecting the fact that sexual violence is a social issue that disproportionately affects women (Garcia-Moreno et al., 2005). In the case of the present study, this limitation may have reduced statistical power and restricted the generalizability of the results, particularly to survivors with more complex or chronic victimization trajectories, as is often the case with non-DFSA survivors. Nevertheless, the decision to apply these strict exclusion criteria—excluding survivors with childhood SA, prior adult SA, other traumatic events, or comorbid mental health conditions—allowed us to obtain a highly specific and homogeneous sample. This methodological decision allowed for a more direct examination of the effects of substance involvement in recent, isolated SA while controlling for confounding factors, thereby enhancing its internal validity and enlarging the knowledge about this under-researched population. Another methodological consideration concerns the sociodemographic composition of the sample, which consisted predominantly of participants of European descent. While this reflects the population attending the clinical setting where data collection took place, it may limit the applicability of the findings to survivors from other ethnic and cultural contexts. Given that cultural background can influence both emotion regulation strategies and the expression of psychological symptoms (Schunk et al., 2022), future studies should incorporate more diverse populations to ensure representativeness and inclusivity in sexual trauma research.

Additional limitations relate to the instruments employed. Measures of SF, psychological symptoms, and emotion regulation were based on self-reports, which may be subject to memory biases or social desirability effects. Nonetheless, the use of standardized and validated questionnaires ensured

comparability of responses across groups. Moreover, in the specific case of SF, self-report remains one of the most widely used methods, as it enables participants to describe their intimate experiences in a more personal and less intrusive manner than structured interviews. At the same time, although the CAPS-5 provided a structured diagnostic assessment of PTSD with improved reliability, it may still fail to capture the full complexity of trauma-related presentations, particularly in atypical cases with overlapping features (Ruglass et al., 2020).

Regarding the eye-tracking studies, several methodological limitations deserve attention. First, while the use of non-sexual emotional images was intentional to avoid participant discomfort and the risk of trauma-specific reactivity, these stimuli may not evoke the same trauma-related reactions as content more closely tied to the context of the assault, as it was reflected particularly in the non-DFSA results. Nonetheless, it is important to note that one of the objectives of the present study was to examine attentional bias among DFSA survivors (i.e., with high uncertainty and lack of a clear narrative about their traumatic event); therefore, specific trauma-related stimuli may not be meaningfully connected to the individual's subjective experience. In this context, the use of more general emotional stimuli allowed for a controlled assessment of threat sensitivity without triggering trauma-specific reactivity that may not be uniformly processed across participants. Additionally, general socio-emotional stimuli offered a more consistent and ecologically valid approach, reflecting real-life attentional demands where multiple complex cues must be processed simultaneously.

Despite these limitations, the present research also presents several methodological strengths. Across objectives, rigorous exclusion criteria enabled us to disentangle the specific effects of DFSA on mental health, sexual functioning, emotion regulation, and attentional processing. The inclusion of a well-defined clinical sample, in combination with innovative methods such as eye-tracking, provides greater ecological and clinical relevance compared to prior studies that relied primarily on community samples and traditional tasks (e.g., Stroop, dot-probe). Eye-tracking allowed for a temporally fine-grained analysis of attentional processes across phases (initial orienting, engagement, and sustained attention), offering a more nuanced perspective on trauma-related

cognitive mechanisms. Furthermore, the decision to evaluate PTSD symptoms dimensionally and at the cluster level, rather than categorically, captured associations with attentional biases and psychological symptoms that would likely have been overlooked in dichotomous diagnostic approaches (Lee & Lee, 2014). Finally, unlike most previous work that has focused narrowly on PTSD and depression, this thesis examined a broader range of psychological symptoms and specific domains of emotion regulation, providing a more comprehensive picture of the mental health consequences of SA. By systematically comparing DFSA and non-DFSA survivors, this research highlights both shared and distinct pathways of posttraumatic adjustment, contributing valuable knowledge for clinical assessment and intervention.

Conclusions

Key Findings

This thesis demonstrates that the psychological consequences of SA cannot be fully understood through categorical diagnostic approaches focused solely on PTSD. Instead, while PTSD and severe sexual impairments remain prevalent outcomes across survivors, our findings reveal substantial heterogeneity in symptom profiles, highlighting the necessity of a dimensional and transdiagnostic perspective. By examining both DFSA and non-DFSA survivors, we observed that the type of assault critically shapes both psychopathological trajectories and attention to emotional information. For instance, non-DFSA survivors reported more difficulties in emotional regulation and broader psychopathological profiles, showing higher levels of anxiety and psychoticism. Regarding attentional patterns, DFSA survivors are characterized by sustained attention toward threat, reflecting an alert system linked to uncertainty and a lack of agency. Non-DFSA survivors, by contrast, exhibit a lack of attentional modulation by emotional information linked to emotional disengagement, likely arising from the full awareness and coherent recollection of the traumatic event.

A core contribution of this thesis is the integration of self-report measures with eye-tracking methodology, which provides objective and temporally precise evidence of attentional dynamics that cannot be verbalized. Eye-tracking data revealed differential patterns: sustained attention to threat in DFSA and emotional disengagement in non-DFSA, illustrating that cognitive-emotional mechanisms vary according to assault type. Importantly, these attentional processes interact with symptom dimensions such as avoidance and dissociation, underscoring that post-traumatic psychopathology is shaped not only by overt symptom expression but also by underlying cognitive-affective mechanisms that remain inaccessible to verbal report.

Clinical Implications

From a clinical perspective, these findings support designing interventions that are both tailored and process-focused, targeting shared and assault-specific mechanisms. For DFSA survivors, therapy should aim to reconstruct fragmented narratives, decrease threat monitoring, foster emotional acceptance, and promote self-compassion within the context of guilt. For non-DFSA survivors, interventions should focus on reducing intrusive memories, improving emotional regulation, and helping reconnect with affective experiences to counteract emotional disengagement. Combining self-reported symptoms with objective attentional measures, such as eye-tracking, allows clinicians to detect cognitive-emotional biases that might otherwise go unnoticed, enabling more precise and personalized treatment strategies. This approach highlights the need to move beyond a solely symptom-based model toward one that considers the dynamic interaction between cognition, emotion, and sexuality after trauma.

Implications for Research

These findings also carry important implications for future research. They highlight the need for process-oriented, multimodal frameworks that integrate symptom dimensions, emotional regulation, and attentional processes to capture the psychological consequences of SA fully. Eye-tracking and similar objective

methodologies offer a window into mechanisms that cannot be fully accessed through self-report, especially in survivors with fragmented or incomplete trauma narratives, such as those who have experienced DFSA. Additionally, our results underscore the importance of examining both shared and unique mechanisms underlying post-traumatic outcomes, including hyperarousal, negative cognitions, and mood disturbances, as these processes appear to contribute consistently to sexual dysfunction and broader psychopathology. Future studies should also prioritize more diverse samples and explore variables such as cultural background, gender, and voluntary versus involuntary substance use, to enhance generalizability and deepen understanding of how contextual and individual factors shape post-traumatic trajectories.

Overall, the findings emphasize the necessity of studying DFSA survivors as a distinct group, as the phenomenological characteristics of this type of assault shape unique psychopathological, emotional, and cognitive outcomes. Conceptualizing DFSA simply as a subtype of SA risks obscuring these differences and, in turn, overlooking clinical needs that fall outside conventional PTSD-centered frameworks. The results of this thesis demonstrate that DFSA survivors present specific transdiagnostic symptom patterns, distinctive regulatory difficulties, and attentional biases that cannot be fully explained by models developed for other SA cases. By combining dimensional symptom assessments with objective measures of attentional processing, this work provides a more precise and clinically relevant account of DFSA consequences. In doing so, it underscores the value of distinguishing between DFSA and non-DFSA in both research and clinical settings, laying the groundwork for more refined theoretical models and more effective, individualized therapeutic strategies. Ultimately, this thesis shows that DFSA cannot be understood as a mere variant of sexual assault but must be studied as a distinct phenomenon, with its own trajectories, mechanisms, and clinical implications. Recognizing this specificity is not only a matter of advancing knowledge; it is a clinical necessity, essential to building models and interventions that truly reflect the complexity of survivors' experiences.

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ANNEXES

The following articles reproduce, either in part or in full, the results already presented in this thesis. Any overlap in tables, figures, or text is intentional, as these publications are directly derived from the research carried out for the present thesis.

Annexe 1. Attentional bias toward emotional stimuli in drug-facilitated sexual assault survivors: A two-alternative free-viewing eye-tracking study

Marta Lizarán^{a,b}, Nadina Gómez-Merino^c, Adrián Torres-Villasante^d, Julia Andreu-Martínez^e, Alba Moreno-Giménez^{a,b}, Belén Almansa^{a,b}, Ana García-Blanco^{a,b,e}

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a Mental Health Research Group, Health Research Institute La Fe, Avenida Fernando Abril Martorell 106, Valencia 46026, Spain

b Department of Personality, Evaluation and Psychological Treatment, Faculty of Psychology, University of Valencia, Av. Blasco Ibáñez, 21, 46010, Valencia, Spain

c ERI-Lectura, Faculty of Psychology, University of Valencia, Av. Blasco Ibáñez, 21, 46010, Valencia, Spain

d Pere Virgili Health Research Institute, University Hospital of Tarragona Juan XXIII, Carrer Dr. Mallafré Guasch, 4, 43007 Tarragona, Spain

e Department of Psychiatry and Clinical Psychology, La Fe University and Polytechnic Hospital, Avenida Fernando Abril Martorell 106, Valencia 46026, Spain



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Attentional bias toward emotional stimuli in drug-facilitated sexual assault survivors: A two-alternative free-viewing eye-tracking study

Marta Lizarán^{a,b}, Nadina Gómez-Merino^c, Adrián Torres-Villasante^d,
Julia Andreu-Martínez^c, Alba Moreno-Giménez^{a,b}, Belén Almansa^{a,b},
Ana García-Blanco^{a,b,e,*}

^a Mental Health Research Group, Health Research Institute La Fe, Avenida Fernando Abril Martorell 106, Valencia 46026, Spain^b Department of Personality, Evaluation and Psychological Treatment, Faculty of Psychology, University of Valencia, Av. Blasco Ibáñez, 21, 46010, Valencia, Spain^c ERU-Lectura, Faculty of Psychology, University of Valencia, Av. Blasco Ibáñez, 21, 46010, Valencia, Spain^d Pere Virgili Health Research Institute, University Hospital of Tarragona Joan XXIII, Carrer Dr. Mallafrè Gualich, 4, 43007 Tarragona, Spain^e Department of Psychiatry and Clinical Psychology, La Fe University and Polytechnic Hospital, Avenida Fernando Abril Martorell 106, Valencia 46026, Spain

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ABSTRACT

Drug-Facilitated Sexual Assault (DFSA) survivors represent an under-researched clinical population that may constitute a distinct psychopathological profile among sexual assault survivors, as their experiences are often accompanied by confusion, memory impairment, and a lack of narrative coherence. This is the first study to investigate emotion-related attentional mechanisms in DFSA survivors using eye-tracking technology, as a window into broader cognitive processing. A clinical sample of 39 women who had experienced a recent, isolated sexual assault (19 DFSA, 20 non-DFSA) and 35 demographically matched non-exposed controls completed a free-viewing task while their eye movements were recorded. Participants viewed emotional images (threatening, happy, and neutral) paired with control neutral scenes. DFSA survivors showed a clear attentional bias toward threatening images during later attentional stages (engagement and sustained attention), while non-DFSA survivors did not exhibit significant modulation based on emotional content. Controls displayed typical emotion-driven attention, with sustained focus on happy stimuli. PTSD symptom clusters also influenced attentional patterns: greater avoidance was associated with reduced fixation time to emotional scenes, and dissociative symptoms with increased fixation time to neutral ones. These symptoms were more prevalent in the non-DFSA group. These findings suggest that attentional responses to emotional information vary according to assault typology and are shaped by specific PTSD symptom profiles. Clinically, this highlights the need for trauma interventions tailored to individual patterns of attention and emotional engagement. In particular, DFSA survivors may benefit from strategies that address threat sensitivity, while non-DFSA survivors may require approaches that promote emotional reconnection and reduce avoidance.

Introduction

Sexual assault (SA) is a severe form of interpersonal trauma involving unwanted sexual contact through force, incapacitation, or coercion. Globally, between 0.3 % and 12 % of women have reported experiencing such assaults (García-Moreno et al., 2009). SA is strongly associated with a range of posttraumatic stress symptoms (Campbell et al., 2009; Dworkin et al., 2017). However, the cognitive and emotional mechanisms that sustain this distress remain insufficiently

understood. Recent research highlights attentional biases toward emotional information as a key process underlying trauma-related symptoms (Latack et al., 2017), due to the role of attention in emotion regulation and its link with psychological outcomes (Klamecky Earl et al., 2020). However, given the heterogeneity of SA experiences, it is crucial to consider the role of both individual and contextual factors in determining psychological consequences. One such factor is drug-facilitated sexual assault (DFSA), where the survivor is incapacitated by substances during the assault. DFSA has been associated with

* Corresponding author.

E-mail addresses: marta.lizaran@islafe.es (M. Lizarán), nadina.gomez@uv.es (N. Gómez-Merino), adrian.torres@isprv.cat (A. Torres-Villasante), andreu.julia@gva.es (J. Andreu-Martínez), alba.moreno@islafe.es (A. Moreno-Giménez), belen.almansa@islafe.es (B. Almansa), ana.garcia.blanco@uv.es (A. García-Blanco).<https://doi.org/10.1016/j.ijchp.2025.100625>

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impaired trauma memories, in addition to a lack of a coherent trauma narrative, profound disruption of perceptual awareness, a perceived loss of control over one's body, and persistent uncertainty regarding what occurred during the event, which may hinder the encoding and integration of the experience (Fields et al., 2022; Gauntlett-Gilbert et al., 2004; Saint-Martin et al., 2006). Subsequently, this may also affect the post-assault information processing and potentially shape psychological distress. Building on these considerations, the present study aims to explore whether attentional biases toward emotional stimuli differ between DFSA and non-DFSA survivors, to better understand how the specific characteristics of DFSA may modulate attentional processing and contribute to distinct psychological profiles.

Attentional bias to emotional information refers to the preferential allocation of attentional resources toward emotionally salient stimuli compared to neutral ones (Cisler & Koster, 2010). The emotional Stroop task is widely used to assess this bias, as it reveals cognitive interference through slower color naming of emotionally salient words compared to neutral ones (Williams et al., 1996). Research using this task with SA survivors has examined community samples of adults who experienced SA in childhood (Bremner et al., 2004; McNally et al., 2000), adulthood (Cassiday et al., 1992; Fleurkens et al., 2011; Foa et al., 1991), individuals with histories of revictimization (Field et al., 2001; Patriquin et al., 2012), and samples not distinguishing between childhood and adult abuse (Martinson et al., 2013). These studies typically compare survivors with and without post-traumatic stress disorder (PTSD), yielding mixed findings. While some report greater interference for trauma-related words in survivors with PTSD (Cassiday et al., 1992; Foa et al., 1991), others found no differences (Bremner et al., 2004; Martinson et al., 2013). Similarly, when comparing SA survivors without PTSD to healthy controls, results vary: whereas Cassiday et al. (1992) observed greater interference in survivors, others reported no group differences (Foa et al., 1991; Martinson et al., 2013; Patriquin et al., 2012). To integrate these inconsistencies, Latack et al. (2017) conducted a meta-analysis showing that SA survivors overall exhibit a significant attentional bias toward trauma-related stimuli, particularly those with PTSD, highlighting the role of PTSD symptoms in attentional processing. To further clarify this mechanism, McNally et al. (2000) examined the moderating role of trauma memory in adult survivors of childhood SA, comparing those with repressed, recovered, or continuous memories of the assault to non-victimised controls. Although greater interference was observed in those with recovered and continuous memories, relevant PTSD symptoms emerged as the strongest predictor of attentional bias. These findings underscore the relevance of PTSD but leave open questions about survivors who lack clear trauma memory, particularly relevant in DFSA cases. Investigating this subgroup within a clinical sample may be especially valuable, as these samples often include individuals with greater functional impairment, offering a more sensitive context for detecting attentional disruptions associated with trauma-related psychological difficulties.

Despite valuable insights, the widespread use of the emotional Stroop task presents methodological limitations. This paradigm primarily captures generalized cognitive interference, without isolating specific attentional processes such as initial orienting or disengagement from emotional content. Therefore, it remains unclear whether delays reflect genuine attentional biases or broader cognitive or emotional load related to trauma. To address these limitations, researchers have turned to tasks with greater temporal and spatial precision, such as the dot-probe paradigm and eye-tracking methods. The dot-probe task attempts to isolate attentional orienting by briefly presenting stimulus pairs—typically one threat-related and one neutral—followed by a probe in the location of one stimulus. Faster responses to probes replacing threat stimuli indicate attentional prioritization (MacLeod et al., 1986). Hirai et al. (2022) used this paradigm with threat-related and neutral words, comparing three community-based groups: i) women with a history of childhood SA (with or without adult revictimization); ii) women with adulthood SA; and iii) non-exposed controls.

SA groups showed greater attentional bias toward threat-related words compared to controls, but no significant differences appeared between survivor subgroups. Although participants with other traumas were excluded from the study, grouping childhood and revictimized cases may have obscured the effects of trauma timing and accumulation. Furthermore, reliance on retrospective reports limits applicability to recent assault survivors. Examining individuals with a single, recent adulthood SA could clarify attentional biases more directly attributable to the assault.

Nevertheless, even in targeted samples, the dot-probe task, like the Stroop task, indirectly infers attention through reaction times, which are influenced by additional cognitive and motor processes, thereby limiting insight into how attention unfolds over time (Kimble et al., 2010; Thomas et al., 2013). This is particularly problematic in trauma-exposed populations, where attentional patterns may shift rapidly or occur outside conscious awareness (Lazarov et al., 2019). To address these limitations, recent studies have turned to eye-tracking, a method that directly and continuously measures visual attention, allowing for a more detailed analysis of engagement with trauma-related stimuli. Eye movements closely reflect attentional shifts during visual tasks, where relevant complex stimuli compete for cognitive resources (e.g., social-emotional images) (Lazarov et al., 2019). By tracking gaze patterns over time, eye-tracking captures early attentional processes, such as initial orienting, and later attentional processes, such as engagement or sustained attention (Armstrong et al., 2013; Lazarov et al., 2019). Although no studies have used this method with SA survivors, related research in interpersonal violence offers useful insights. For instance, Lee and Lee (2012) studied women with histories of intimate partner violence (including psychological, physical, and sexual abuse) with and without PTSD, and a non-victimised control group. They presented a free-viewing paradigm with four emotional social scenes (threatening, happy, sad, and neutral) for 10 s. While no differences appeared in initial orienting, they found that survivors with PTSD showed more sustained attention on threatening images compared to both survivors without PTSD and non-exposed controls. Additionally, all survivors, regardless of the PTSD, displayed an attentional bias toward sad stimuli and reduced attention to happy scenes relative to the control group. To enhance experimental control when examining initial attentional orienting, Lee and Lee (2014) conducted a later study with the same trauma-survivor groups, administering an alternative task in which pairs of facial expressions were presented for 10 s (angry, fearful, or happy vs. neutral; and angry or fearful vs. happy). Researchers found no group differences in initial attention, although survivors with high PTSD showed longer sustained attention towards angry faces (vs. neutral) than low PTSD survivors, who in turn showed longer sustained attention than controls. For fearful faces, both survivor groups showed longer sustained attention than controls, with no significant differences between them. These findings point to a gradient of sustained attention as a function of PTSD symptom severity, especially in response to anger-related cues; however, the results can not be generalized to SA survivors, as samples are not comparable. Additionally, given PTSD's dimensional nature and the varied cognitive impact of its symptom clusters, future research should explore how specific symptom dimensions relate to attentional biases for a more nuanced understanding of trauma processing.

This study aims to address key gaps in the literature by comparing attentional biases in a clinical sample of individuals with DFSA and those without DFSA. To isolate the effects of trauma type, participants were selected based on the experience of a single SA episode within the past year, with no prior SA, other traumatic experiences, or pre-existing mental health conditions. A demographically matched control group was also recruited. To examine early attentional orienting, engagement, and sustained attention, we employed a free-viewing eye-tracking paradigm, using emotionally relevant images (threatening, happy, neutral) paired with control non-social stimuli, avoiding the use of sexually explicit stimuli that may be processed differently for DFSA survivors, who often lack detailed recollections. Additionally, PTSD

symptom severity was explored to examine its potential associations with attentional biases. Based on previous findings, we propose three hypotheses: (i) drawing on research on attentional bias and memory impairment, we hypothesize that DFSA survivors will show fewer attentional bias toward threatening stimuli compared to non-DFSA survivors, likely resembling controls more closely (McNally et al., 2000); (ii) following Lee and Lee (2014) with a similar task and a sample of interpersonal trauma survivors, we expect no group differences during early attention stages neither with the control group; however, we anticipate that SA survivors overall will show increased sustained attention and engagement to threatening stimuli (Cassiday et al., 1992; Fleurkens et al., 2011; Foa et al., 1991; Martinson et al., 2013); and (iii) to extend prior PTSD research (see Lazarov et al., 2019 for a systematic review in PTSD samples), we hypothesize that specific PTSD symptom severity would associate particular attentional bias to threat in SA survivors.

Methods

Participants

Case files from 400 users of a foundation assisting SA survivors were reviewed. From these, 133 cases were selected based on the criterion that the assault had occurred within the past year, ensuring recency of trauma exposure. A priori sample size was calculated using G*Power (version 3.1.9.7) for a repeated-measures ANOVA with one between-subjects factor (three groups) and one within-subjects factor (four valences). The calculation was based on a medium effect size ($f = 0.25$), an alpha level of 0.05, a power of 0.80, and a conservative correlation among repeated measures of 0.5. The minimum required sample size was estimated at 66 participants. Our final sample of 74 women exceeded this threshold. After applying exclusion criteria—including being under 18 years old, having a history of childhood SA or previous

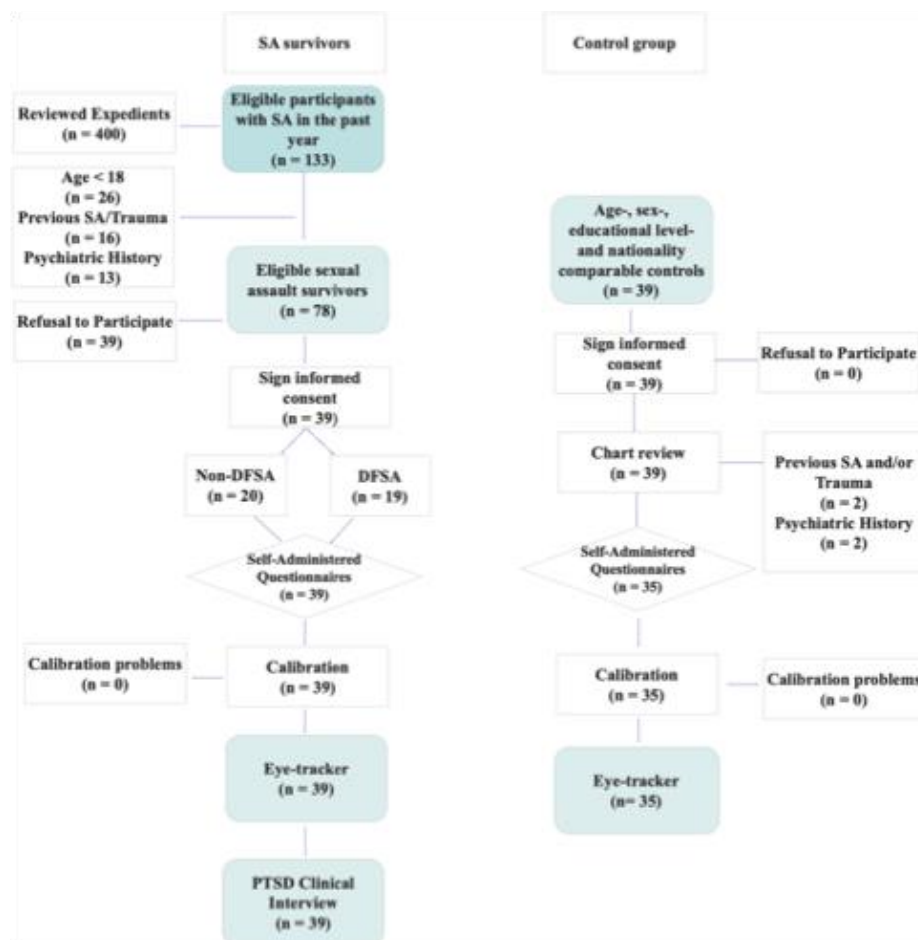


Fig. 1. Sample recruitment flowchart.

SA, other traumatic experiences (e.g., disasters, kidnapping, family homicide), or prior psychiatric diagnosis—a total of 39 women were included. These participants were divided into two clinical groups: (1) A group of non-DPSA survivors, that is, survivors of SA involving physical force or coercion, but no DF ($n = 20$), and (2) survivors of DPSA ($n = 19$). An age-, gender-, education-, and nationality-matched control group ($n = 35$) was recruited through community advertisements, applying the same exclusion criteria and additionally requiring no history of SA. An ethics committee approved the study on May 19, 2020 (Ethics Code: 2020-065-1), and all participants provided informed consent. See Fig. 1 for the sample recruitment flowchart. Sociodemographic data are described in Table 1.

Materials

All participants provided informed consent, and the study was approved by the institutional ethics committee. PTSD symptoms were assessed using the PTSD Scale Clinician-Administered for DSM-5 (CAPS-5; Weathers et al., 2018), which evaluates 20 items on a 0–4 severity scale, yielding a total score (0–80) and scores for each DSM-5 symptom cluster: re-experiencing (B), avoidance (C), negative cognitions and mood (D), hyperarousal (E), and dissociation. The CAPS-5 has demonstrated high internal consistency ($\alpha = 0.88$) and test-retest reliability ($\kappa = 0.83$) (Weathers et al., 2018).

Stimuli

The stimuli included 128 scenes selected from the *International Affective Picture System* (Lang et al., 2005). The stimuli were the same as those used in Nummenmaa et al. (2006) and varied only in emotional valence and arousal, while being matched for visual properties such as complexity and luminance. For each emotional category, 16 images were selected, corresponding to happy, threatening, and neutral social scenes. Happy scenes depicted individuals with positive affect, threatening scenes showed either hostile individuals or people in threatening situations, and neutral scenes portrayed individuals engaged in everyday activities. Additionally, 80 non-social control images of inanimate objects were included. Because our study employed the validated stimulus set and task parameters from Nummenmaa et al. (2006), no additional affective ratings were collected from the present sample, which also helped to avoid potential practice or carry-over effects. According to the original validation, happy images were rated more positively than both threatening and control images, and neutral and control images were rated more positively than threatening ones, with no significant difference between neutral and control images. In terms of arousal, happy and threatening images elicited higher arousal ratings than neutral and control images, though no differences were found between happy and threatening stimuli, or between neutral and control stimuli. Participants viewed 64 trials (48 experimental, 16 filler), each composed of two randomly paired images. These included 16 trials each for happy-control, threatening-control, and neutral-control pairs, along with 16 filler trials of neutral-control pairs. Each trial began with a central fixation cross, which disappeared after a steady gaze. Image pairs appeared for 3 s in diagonally opposite screen corners, with image positions counterbalanced across trials. Randomization of presentation order and image placement ensured that participants could not rely on a fixed visual scanning strategy. See Fig. 2 for an illustration of how a trial was presented.

Apparatus

Eye movements were recorded using a portable Tobii Pro Fusion Eye Tracker with a 250 Hz sampling rate; no chin-rest was used since the apparatus allowed head movement with a high-precision gaze tracking. Visual stimuli were displayed on a 23.8" ASUS VA249HE Full HD (1920 × 1080) LED monitor with a 60 Hz refresh rate, positioned at a viewing

Table 1
Sociodemographic data of non-DPSA survivors, DPSA survivors, and the Control group.

	non-DPSA (<i>N</i> = 20)	DPSA (<i>N</i> = 19)	Control (<i>N</i> = 35)	<i>p</i>
Females (<i>n</i>)	20	19	35	
Age	25.3 (7.29)	30.2 (8.81)	24.8 (5.17)	0.069
Education (<i>n</i>)				0.172
Primary studies	3	1	0	
Secondary studies	6	5	14	
University Studies	11	13	21	
Nationality (<i>n</i>)				0.087
European	15	12	31	
Latin American	5	7	4	
Sexual Orientation (<i>n</i>)				0.778
Heterosexual	16	15	30	
Homosexual	0	0	0	
Bisexual	4	4	5	
Religion (<i>n</i>)				0.404
Believer	9	10	12	
Non-believer	11	9	23	
Marital Status (<i>n</i>)				0.523
With a partner	8	7	18	
Without a partner	12	12	17	
Type of Sexual Assault (<i>n</i>)				
With penetration	8	15		0.2
Without penetration	12	4		
Injuries after Sexual Assault (<i>n</i>)				0.345
Severe (fractures, tears)	4	2		
Mild (contusions)	9	6		
No injuries	7	11		
Type of intake (<i>n</i>)				<0.001
Voluntary intake	0	6		
Involuntary intake	0	3		
Mixed intake	0	10		
No intake	20	0		
Substance ingested				
Alcohol		7		<0.001
Other substances (drugs or medication)		3		
Mixed substances		9		
Report (<i>n</i>)	16	15		0.935
Pregnancy (<i>n</i>)	0	0		
Memory of the assault				0.037
No memories	3	8		
Partial memories	5	7		
Full memory	12	4		
Number of therapy sessions	4.4 (4.45)	2.36 (5.49)		0.00
Number of perpetrators	1 (0.00)	1.15 (0.37)		0.00
Age of perpetrators	32.35 (13.56)	28.84 (14.69)		0.00
Nationality of perpetrators (<i>n</i>)				0.15
Same as the victim	14	6		
Different from the victim	9	10		
Male perpetrators (<i>n</i>)	20	19		
Relationship with the perpetrator (<i>n</i>)				0.13
Stranger	4	5		
Recent acquaintance	7	11		
Intimate relationship	9	3		
Scenario of aggression (<i>n</i>)				0.33
Private	13	15		
Public	7	4		
Physical consequences (<i>n</i>)	11	8		0.42
Sexually transmitted infections (<i>n</i>)	5	3		0.47
Meet criteria for PTSD	14	9		0.151
PTSD symptoms severity				
Re-experiencing	12.65(3.29)	8.64(4.38)		0.004
Avoidance	5.2(1.36)	4.21(1.51)		0.038
Cognitions and mood	13.7(6.04)	11.31 (4.57)		0.175

(continued on next page)

Table 1 (continued)

	non-DFSA (N = 20)	DFSA (N = 19)	Control (N = 35)	p
Hyperarousal	11.75(5.62)	9.52(5.70)		0.228
Distress	7.55(2.48)	5.26(2.6)		0.008
Dissociative	1.7(2.1)	0.05(0.22)		0.002
Total severity	43.8(13.21)	33.89 (13.66)		0.03

Note. Data are presented as means, with standard deviations shown in parentheses.



Fig. 2. Example of a trial with a threatening image vs a neutral image from the free-viewing task.

distance of 60 cm.

Procedure

Participants completed demographic questionnaires and the CAPS-5 before the eye-tracking session. They were seated in a height-adjustable chair in a dimly lit, sound-attenuated room. Before starting the task, a calibration procedure was performed using a nine-point moving target followed by a four-point validation, with an acceptable error threshold of $<1.5^\circ$. The calibration was repeated as many times as necessary until this criterion was met, ensuring high accuracy of gaze data. Consequently, no participants were excluded due to calibration failure or signal loss. Additionally, in accordance with standard eye-tracking quality protocols, a trial was excluded from analysis if fewer than 75 % of gaze samples (individual data points recorded at 250 Hz) were successfully captured or if no fixation was detected within any area of interest (AOI). To ensure robust data for analysis, participants were required to retain at least 75 % of trials in each condition (9 out of 12) and 75 % of trials overall (48 out of 64). All participants successfully met these inclusion criteria. Furthermore, the average gaze sample retention rate for the entire sample was high (86 %), indicating consistently reliable data collection across participants and conditions. Participants were instructed to free-view the images naturally, "as if looking at a photo album". The experimenter monitored calibration and performance in real time.

Data analysis

Data were processed using a velocity-based algorithm, applying a minimum fixation duration threshold of 100 ms and a peak velocity threshold of $40^\circ/\text{s}$ to identify fixation events. Areas of interest (AOIs) were defined as the full extent of each visual scene. To examine different

stages of attentional processing, several eye-tracking measures were extracted. Early attentional processes, referred to as orienting, were assessed through the latency and direction of initial eye movements occurring immediately after stimulus onset. These were captured using two indices: (i) initial fixation latency, measuring the time (in ms) taken to first fixate on the target scene, and (ii) initial fixation probability, which was defined as the proportion of trials in which the very first fixation after stimulus onset landed on the AOI corresponding to the target emotional (happy, threatening, neutral) versus the paired control image. This metric reflects the initial attentional orienting toward a given stimulus category. Subsequent attentional engagement—operationalized here as the depth of attentional allocation during the first encounter with a stimulus—was indexed by (iii) first-pass duration (i.e., the sum of fixation durations made on the image during its initial viewing, before the gaze shifted away). Finally, sustained attention, or the prolonged allocation of attention over time, was assessed through two complementary indices: (iv) percentage of total duration, capturing the proportion of the entire viewing time (including re-fixations) spent on the target scene during the 3-second presentation window, and (v) percentage of total fixations, representing the proportion of the total number of fixations and re-fixations on the scene throughout the viewing period.

Eye movement data were analyzed using a 3 (Group: non-DFSA, DFSA, Control) $\times$ 3 (Valence: neutral, happy, threatening) mixed-design analysis of variance (ANOVA), with Group as the between-subjects factor and Valence as the within-subjects factor. When a significant interaction between Group and Valence was observed, follow-up simple effects analyses were conducted. For comparisons involving the Valence factor, *p*-values were adjusted using the Bonferroni correction to control for multiple comparisons. In addition, exploratory correlation analyses were conducted within the non-DFSA and DFSA groups to assess the associations between attentional outcomes and PTSD symptom severity, as measured by CAPS-5 scores. All statistical analyses were conducted using SPSS (version 30.0.0).

Results

Descriptive data of the measures are displayed in Table 2.

Latency of the initial fixation

The ANOVA of the latency of initial fixation only showed that the effect of Valence approached significance, $F(2,142) = 13.11, p < .001, \eta^2 = 0.16$, with significantly shorter latencies for happy and threatening images compared to neutral ones (all *ps* < 0.001). Neither the effect of Group nor the Valence $\times$ Group interaction was significant (all *Fs* < 1).

Probability of initial fixation

Neither the Group, the Valence effect, nor the Valence $\times$ Group interaction was significant (all *Fs* < 1).

First-pass duration

The ANOVA on first-pass duration revealed a significant main effect of Valence, $F(2, 142) = 16.62, p < .001, \eta^2 = 0.19$, which was further qualified by a significant Valence $\times$ Group interaction, $F(4, 142) = 3.04, p = .019, \eta^2 = 0.079$. No significant main effect of Group was observed ($p = .22$).

To further explore the Valence $\times$ Group interaction, simple effects analyses were conducted to examine the effect of Valence within each group. A significant Valence effect was found for the DFSA group, $F(2, 36) = 13.40, p < .001, \eta^2 = 0.427$, and for the control group, $F(2, 68) = 3.91, p = .025, \eta^2 = 0.103$, but not for the non-DFSA group ($p = .14$). In the DFSA group, first-pass duration was significantly longer for threatening images compared to happy ($p < .001$) and neutral images ($p =$

Table 2
Eye-Tracking Measures for Neutral, Happy, and Threatening Stimuli Across Each Group.

		Neutral	Happy	Threatening
Latency of first fixation (ms)	non-DFS	777.40	732.09	693.49
	DFS	(240.27)	(250.29)	(279.26)
	DFS	738.19	624.01	619.63
	Control	(204.88)	(175.56)	(279.26)
Probability of first fixation (%)	non-DFS	53.75(8.45)	54.06(7.66)	53.13(14.97)
	DFS	53.62	55.92(9.42)	55.59(15.71)
	DFS	(11.08)	56.23	58.31(9.17)
	Control	54.57(9.60)	(11.03)	
First-pass duration (ms)	non-DFS	1020.73	1061.24	1137.58
	DFS	(279.02)	(305.73)	(296.15)
	DFS	1019.02	1227.74	1351.68
	Control	(268.48)	(396.3)	(392.19)
Percentage of total duration (%)	non-DFS	52.40(7.11)	54.70(7.13)	56.01(10.02)
	DFS	51.24(5.06)	58.25(8.96)	62.30(10.22)
	DFS	55.36(8.72)	59.73	57.94(7.21)
	Control	(11.15)		
Percentage of total fixation (%)	non-DFS	52.87(4.99)	53.80(6.63)	55.44(8.71)
	DFS	49.92(3.99)	56.93(8.63)	60.31(8.66)
	DFS	54.73(7.43)	58.84	56.94(3.74)
	Control	(10.26)		

Note. Data are presented as means, with standard deviations shown in parentheses.

.001), and for happy images compared to neutral ones ($p = .003$). In the control group, first-pass duration was significantly longer for threatening images and happy images compared to neutral ones ($p = .007$ and $p < .001$, respectively); no differences were found between threatening and happy images ($p = .15$). See Fig. 3.

Percentage of total duration

The ANOVA of the percentage of total duration revealed an effect of Valence, $F(2, 142) = 12.97, p < .001, \eta^2 = 0.154$, which was qualified by a Valence x Group interaction, $F(4, 142) = 2.73, p = .031, \eta^2 = 0.071$. No significant Group effect was found ($p = .19$).

To examine the Group x Valence interaction, we conducted simple effects tests of Valence for each Group. While a Valence effect was found

for the DFS group, $F(2, 36) = 12.78, p < .001, \eta^2 = 0.415$, and the control group, $F(2, 68) = 3.18, p = .048, \eta^2 = 0.085$, it was not found in the non-DFS group ($p = .22$). In the DFS group, the percentage of total duration was significantly longer for threatening images compared to happy ($p < .001$), no other differences were found (all $ps > 0.58$). In the control group, the percentage of total duration was significantly longer for happy images compared to neutral ones ($p < .001$). No other differences were found (all $ps > 0.27$). See Fig. 4a.

Percentage of total fixations

The ANOVA of the percentage of total duration revealed an effect of Valence, $F(2, 142) = 14.62, p < .001, \eta^2 = 0.171$, which was qualified by a Valence x Group interaction, $F(4, 142) = 4.14, p = .003, \eta^2 = 0.104$. No significant Group effect was found ($p = .25$).

To examine the Group x Valence interaction, we conducted simple effects tests of Valence for each Group. While a Valence effect was found for the DFS group, $F(2, 36) = 24.09, p < .001, \eta^2 = 0.572$, and the control group, $F(2, 68) = 3.51, p = .035, \eta^2 = 0.094$, it not found in the non-DFS group ($p = .32$). In the DFS group, the percentage of total fixations was significantly longer for threatening images compared to happy ($p < .001$), and neutral images ($p = .011$), and for happy images compared to neutral ones ($p = .018$). In the control group, the percentage of total duration was significantly longer for happy images compared to neutral ones ($p < .001$). No other differences were found (all $ps > 0.12$). See Fig. 4b.

Correlational analyses

Exploratory analyses conducted within the non-DFS and DFS groups examined the relationship between attentional outcomes and the severity of PTSD symptoms. A greater severity of avoidance symptoms was associated with reduced first-pass duration toward both threatening ($r^2 = -0.328, p = .041$) and happy images ($r^2 = -0.407, p = .010$). In contrast, a greater severity of dissociative symptoms was associated with a higher percentage of total fixations on neutral images ($r^2 = 0.326, p = .043$). No other significant associations were observed (all $ps > 0.06$). See Table 3 for the full correlation matrix and the Supplementary Material for scatterplots with regression lines depicting the significant relationships.

Discussion

To our knowledge, this is the first study to investigate attentional biases in DFS and non-DFS survivors using a free-viewing eye-

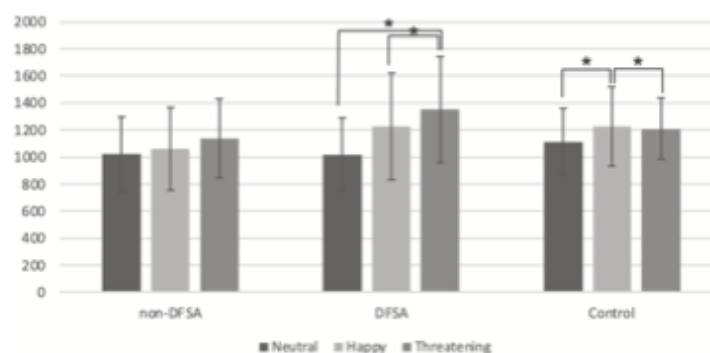


Fig. 3. Bar graph showing group differences in first-pass duration in each emotional valence.

Note: Bars represent mean values; error bars indicate the standard error of the mean. Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

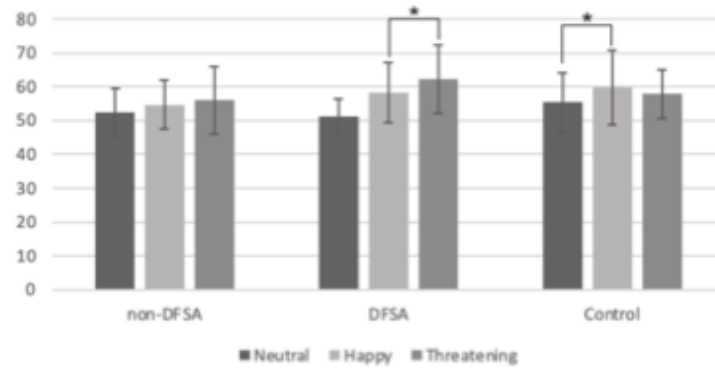


Fig. 4a. Bar graph showing group differences in percentage of total duration in each emotional valence.

Note: Bars represent mean values; error bars indicate the standard error of the mean. Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

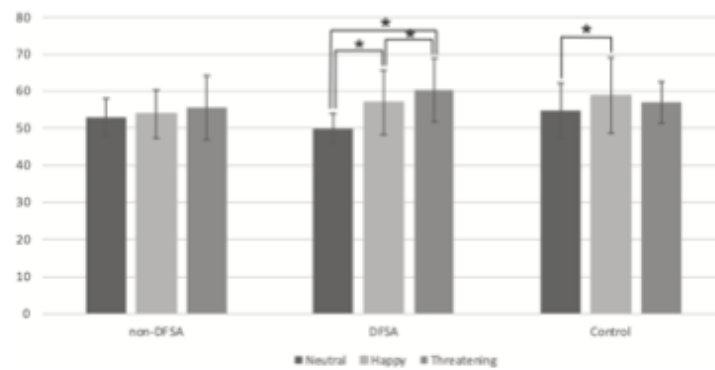


Fig. 4b. Bar graph showing group differences in percentage of total fixations in each emotional valence.

Note: Bars represent mean values; error bars indicate the standard error of the mean. Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

Table 3

Correlation matrix between attentional outcomes and the severity of PTSD symptoms within the non-DFSA and the DFSA groups.

		Reexperiencing	Avoidance	Cognition and mood	Hyperarousal	Distress	Dissociative
First-pass Duration	Neutral	.05 (0.746)	−0.13 (0.423)	.09 (0.587)	.06 (0.703)	.12 (0.433)	.21 (0.186)
	Happy	−0.17 (0.294)	−0.40* (0.010)	−0.07 (0.664)	−0.03 (0.844)	−0.05 (0.752)	−0.15 (0.334)
	Threatening	−0.04 (0.794)	−0.32* (0.041)	.13 (0.406)	.15 (0.362)	.09 (0.575)	−0.23 (0.148)
Percentage of total duration	Neutral	.13 (0.398)	.15 (0.347)	.25 (0.116)	−0.03 (0.848)	.13 (0.411)	.30 (0.057)
	Happy	−0.06 (0.591)	−0.27 (0.094)	−0.05 (0.754)	−0.04 (0.778)	−0.13 (0.423)	−0.14 (0.380)
	Threatening	.02 (0.873)	−0.26 (0.098)	.12 (0.454)	.09 (0.549)	.04 (0.794)	.21 (0.186)
Percentage of total fixations	Neutral	.27 (0.091)	.22 (0.161)	.29 (0.067)	.09 (0.558)	.25 (0.111)	.32* (0.043)
	Happy	−0.03 (0.850)	−0.18 (0.274)	−0.03 (0.819)	−0.02 (0.877)	−0.03 (0.815)	−0.19 (0.240)
	Threatening	.02 (0.894)	−0.24 (0.136)	.11 (0.483)	.05 (0.731)	.07 (0.648)	−0.24 (0.126)

Note. The data show the coefficient of determination (R^2), with significance levels reported in parentheses. Positive correlations are indicated with an asterisk.

tracking task, approximating natural visual exploration of socio-emotional (threatening, happy, and neutral) and non-social stimuli. The results provide converging evidence for emotion-dependent attentional modulation shaped by group differences. Specifically, DFSA survivors exhibited both engagement and sustained attentional biases toward threatening scenes, followed by happy scenes, with comparatively less attention to neutral ones. In contrast, the non-DFSA group showed no attentional bias based on emotional valence. For the control group, although threatening and happy scenes elicited greater attentional engagement than neutral ones, sustained attention was predominantly directed toward happy scenes. Hence, these group-specific patterns were not attributable to differences in initial orienting. Finally, exploratory correlational analyses revealed that greater avoidance symptom severity was associated with reduced first-pass duration on both threatening and happy stimuli, whereas higher dissociative symptomatology was linked to increased fixation frequency on neutral stimuli. These findings highlight the differential contribution of specific PTSD symptom dimensions to attentional processing and underscore the importance of considering SA typology in trauma research.

Contrary to initial hypotheses based on the inaccessibility of traumatic memory studies (McNally et al., 2009), our findings indicated that, unlike non-DFSA survivors, DFSA survivors exhibited an attentional bias toward threatening scenes compared to happy and neutral ones. This attentional pattern may reflect the broader clinical complexity characterizing DFSA experiences. These assaults, in addition to the amnesia regarding the event, often involve a lack of a coherent trauma narrative, profound disruption of perceptual awareness, a perceived loss of control over one's body, and persistent uncertainty regarding what occurred during the event (see Saint-Martin et al., 2006 for a review). Such conditions may hinder the integration of the trauma and contribute to a sustained state of hypervigilance. Within this context, the attentional bias toward threatening stimuli may reflect a threat-monitoring mechanism, whereby ambiguous or socially charged cues (even if not explicitly sexual) gain emotional salience due to their resonance with the unresolved and disorienting features of the traumatic experience (Busardó et al., 2019). In contrast, while the control group displays the expected pattern of attentional engagement with emotional stimuli and sustained attention to positive content—indicative of intact emotional processing—the absence of emotion-dependent attentional modulation in the non-DFSA group may point to a disruption in these normative processes, potentially reflecting affective blunting or reduced emotional responsiveness following trauma. This pattern may indicate the operation of regulatory strategies aimed at dampening emotional arousal in the face of distressing stimuli, such as attentional distraction (Cisler & Koster, 2010). Alternatively, the lack of attentional bias in the non-DFSA group may be attributed to the limited sexual trauma relevance of the socio-emotional scenes used in the present study. That is, although the stimuli depicted scenes with threatening valence, they may not have been sufficiently specific or personally meaningful to evoke trauma-related processing in this group. In line with this, Pineles et al. (2009) found that SA survivors did not exhibit attentional biases when exposed to general threat-related stimuli, emphasizing the importance of stimulus relevance in eliciting trauma-linked attentional patterns. Consistent with this view, previous research employing a different methodology and stimuli that more directly reflect the content of sexual trauma, such as words or images with sexual threat connotations, has reported stronger attentional biases in similar samples (Cassiday et al., 1992; Fleurbaey et al., 2011; Foa et al., 1991; Martusson et al., 2013). Taken together, these findings suggest that attentional biases in non-DFSA survivors may be more likely to emerge when the emotional content of the stimuli closely aligns with the specific nature of their traumatic experience.

Concerning the stages of attentional processing, the absence of group differences during the initial orienting suggests that early, automatic components of attention may not be significantly affected by trauma-related processes. One explanation for this lack of early attentional

biases may lie like the stimuli: complex socio-emotional scenes, as opposed to isolated words or facial expressions, likely required participants to perform an initial rapid scan of the visual scene before selectively engaging with a specific image, thereby limiting the emergence of early attentional modulation (Lazarov et al., 2019). In contrast, differences became evident during later stages, specifically engagement and sustained attention, which rely more heavily on controlled and voluntary processes known to be disrupted by trauma-related difficulties in emotion regulation and attentional control (Gaumnitz-Gilbert et al., 2004; Klanecky Earl et al., 2020). This pattern is consistent with findings from Lazarov et al. (2019) and Lee and Lee (2012, 2014), who reported that attentional biases in trauma-exposed individuals are more likely to emerge during sustained rather than initial attention. The sustained attention observed in the DFSA group may be driven by the uncertainty and fragmented recall associated with the assault (Thompson, 2021), which could increase rumination and perseverative thinking, making it harder to disengage from threat-related cues (Lazarov et al., 2019). Conversely, the absence of attentional modulation among non-DFSA survivors across stages may reflect a different psychological response, likely related to greater acknowledgment and lower uncertainty surrounding the event (Zinzow et al., 2010). These results suggest that controlled attentional patterns are shaped not only by trauma-related processes but also by the emotional valence of social scenes.

Finally, unlike previous research that assessed PTSD categorically (Lazarov et al., 2019; Lee & Lee, 2012, 2014), the present study underscores the value of examining the distinct contributions of specific PTSD symptom clusters to attentional processing. Prior studies have found an association between overall PTSD and attentional bias toward threat-related stimuli, although mostly focused on individuals whose trauma occurred during childhood or in the distant past. This may limit the detection of certain PTSD symptoms, such as avoidance or dissociation, that often emerge more prominently in the acute aftermath of trauma and may exert differential effects on attentional patterns. Our findings reveal that individuals with recent SA and elevated avoidance tendencies tend to engage less with emotionally salient information, while higher levels of dissociative symptoms were associated with increased attention to neutral stimuli. Notably, these PTSD symptoms were more salient among non-DFSA participants than in DFSA ones, which may explain the differences in attentional biases observed between the two groups. According to the Emotional Processing Theory, avoidance of internal and external trauma-related cues is understood as a strategy to reduce emotional distress (Foa et al., 2007). In parallel, the association between dissociative symptoms and the increased number of fixations on neutral stimuli is consistent with the theoretical conceptualization of dissociative symptoms as altered states of consciousness characterized by disruptions in perceptual integration and reduced awareness of the external environment (American Psychiatric Association, 2013). Additionally, these findings extend previous research indicating that dissociative symptoms diminish responsiveness to emotionally charged cues (Herzog et al., 2019). Hence, the attentional shift away from emotionally charged toward neutral content may reflect both a specific psychological profile and a protective strategy common to non-DFSA survivors, allowing them to reduce the exposure to affectively overwhelming stimuli (Herzog et al., 2019; Lanius et al., 2010).

Several limitations should be acknowledged. First, the small sample size—stemming from the strict exclusion criteria and the focus on a female-only sample—may limit the generalizability of the findings. Moreover, the modest sample size constrained our ability to conduct formal moderation analyses (e.g., group $\times$ PTSD interactions). Future studies with larger and more diverse samples should address these limitations and directly test such moderation effects. However, studies using similar populations and methodologies typically rely on small sample sizes and predominantly female participants (Lazarov et al., 2019; Lee & Lee, 2014), likely reflecting the fact that sexual violence is a social issue that disproportionately affects women (García-Moreno et al., 2005). Nevertheless, by excluding individuals with histories of

childhood or prior adult SA, together with other traumatic experiences and mental health conditions, the study was able to isolate the effects of a recent SA, particularly in cases involving DFSA, without the confounding influence of trauma chronicity or cumulative exposure. This methodological decision enhances the internal validity and enlarges the knowledge about this under-researched population. Another potential limitation concerns the nature of the visual stimuli. While the use of non-sexual emotional images was intentional to avoid participant discomfort and the risk of trauma-specific reactivity, these stimuli may not evoke the same trauma-related reactions as content more closely tied to the context of the assault. Nonetheless, it is important to note that one of the objectives of the present study was to examine attentional bias among DFSA survivors (i.e., with high uncertainty and lack of a clear narrative about their traumatic event); therefore, specific trauma-related stimuli may not be meaningfully connected to the individual's subjective experience. In this context, the use of more general emotional stimuli allowed for a controlled assessment of threat sensitivity without triggering trauma-specific reactivity that may not be uniformly processed across participants. Additionally, this design also enhances ecological validity by reflecting real-world attentional demands, where individuals must process and prioritize complex, socially relevant information in dynamic environments. Lastly, although this study may suggest that attentional differences in the DFSA group may be attributed to the absence of clear memories of the assault, we conducted an additional analysis including participants' memory clarity as an independent variable. This variable did not yield significant effects in any of the eye-tracking outcomes (all F s < 1), suggesting that memory clarity alone does not account for the observed attentional patterns.

Despite its limitations, the present study presents several methodological strengths. While many previous investigations have yielded valuable insights using community samples and traditional attentional tasks such as the Stroop or dot-probe paradigms (Foa et al., 1991; Martinson et al., 2013; Cassidy et al., 1992; Fleurkens et al., 2011; McNally et al., 2000; Hirai et al., 2022), the present study contributes to the existing knowledge by employing both a highly specific clinical sample and eye-tracking methodology. This combination enhances the clinical relevance of the findings and allows for a temporally fine-grained examination of attentional processing across its different phases (i.e., initial orienting, engagement, and sustained attention), offering a more nuanced understanding of trauma-related cognitive underlying mechanisms. Finally, assessing PTSD symptoms dimensionally, rather than categorically or divided into higher or lower levels (Lee & Lee, 2014), enabled a more detailed examination of how specific symptom clusters relate to attentional biases, offering insights that may be obscured in dichotomous diagnostic approaches.

In conclusion, our findings reveal a clear dissociation in attentional patterns based on assault typology: DFSA survivors exhibited an attentional engagement and sustained attentional bias toward threatening stimuli, whereas no attentional biases were observed in the non-DFSA group. This suggests that specific clinical features associated with DFSA, such as uncertainty, confusion, and the lack of a coherent narrative of the assault, may play a crucial role in shaping hypervigilant attentional responses to threat. Notably, although early stages of attentional processing appeared unaffected across groups, differences emerged during later, controlled stages of attentional processing (engagement and maintenance). Additionally, our dimensional approach to PTSD symptoms revealed that specific clusters account for variability in attentional patterns. Critically, the non-DFSA group exhibited greater avoidance and dissociation symptoms than the DFSA one, which may explain the absence of attentional bias in the non-DFSA group. Future research should further investigate how these symptom dimensions interact with different trauma contexts and whether attentional processing may serve as a cognitive marker of divergent trajectories of trauma adaptation.

These findings carry significant clinical implications for tailoring the assessment and treatment of sexual assault survivors. For DFSA

survivors, interventions should incorporate strategies to modulate hypervigilance and difficulty disengaging from threat, such as attentional retraining or grounding techniques, to reduce over-engagement. In contrast, for non-DFSA survivors, the absence of emotional modulation and higher avoidance/dissociation highlight the need for approaches that foster emotional reconnection and integration of avoided affect, such as carefully paced exposure-based therapies. Beyond assault typology, our results underscore the value of tailoring interventions to the individual's PTSD symptom profile, as specific clusters exert distinct effects on attention (Klamecky Earl et al., 2020). Integrating attentional assessment into clinical evaluation could thus enhance case formulation by identifying and maintaining cognitive-emotional patterns. Ultimately, recognizing this heterogeneity is key to developing more personalized and effective trauma care pathways.

Author note

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Ethical considerations

This study was approved by the Ethics Committee of Health Research Institute La Fe (Ethics Code: 2020-065-1) on May 19, 2020. All participants provided written informed consent prior to enrolment in the study.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used ChatGPT in order to assist with grammar revision and language refinement. After using this service, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

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Data statement

The datasets generated and analyzed during the current study contain sensitive information related to sexual assault survivors and cannot be made publicly available to protect participant confidentiality. De-identified data can be made available from the corresponding author upon reasonable request, subject to ethical approval and safeguarding of participants' privacy.

Declaration of competing interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.ijchp.2025.100625](https://doi.org/10.1016/j.ijchp.2025.100625).

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Annexe 2. Emotional Dysregulation and Psychological Sequelae In Drug-Facilitated Sexual Assault Survivors

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Emotional Dysregulation and Psychological Sequelae

in Drug-Facilitated Sexual Assault Survivors

Marta Lizarán^{a,b} (marta_lizaran@iislafe.es)
ORCID: 0000-0003-1319-6922

Belén Almansa^{a,b} (belen_almansa@iislafe.es)
ORCID: 0009-0004-1699-0368

Nadina Gómez-Merino^c (nadina.gomez@uv.es)
ORCID: 0000-0001-9234-406X

Cristina Zapata-de Miguel^{a,d} (zapata_cri@gva.es)
ORCID: 0000-0001-8165-4265

Javier Sánchez-Ruiz^a (javier_sanchez@iislafe.es)
ORCID: 0009-0002-9906-6167

Adrián Torres-Villasante^e (adrian.torres@iispv.cat)

Julia Andreu Martínez^d (andreu_julia@gva.es)
ORCID: 0000-0001-7535-4485

Alba Moreno-Giménez^{a,b} (alba_moreno@iislafe.es)
ORCID: 0000-0003-4483-6101

Eugenia Mormeneo Oliveros^d (mormeneo_eug@gva.es)

AUTHOR RESPONSIBLE FOR CORRESPONDANCE:
Ana García-Blanco^{a,d} (ana.garcia-blanco@uv.es) / +34 961244000
ORCID: 0000-0002-7840-000X

AFFILIATIONS

a Mental Health Research Group, Health Research Institute La Fe, Avenida Fernando Abril Martorell 106, Valencia 46026, Spain

b Department of Personality, Evaluation and Psychological Treatment, Faculty of Psychology, University of Valencia, Av. Blasco Ibáñez, 21, 46010, Valencia, Spain

c ERI-Lectura, Faculty of Psychology, University of Valencia, Av. Blasco Ibáñez, 21, 46010, Valencia, Spain

d Department of Psychiatry and Clinical Psychology, La Fe University and Polytechnic Hospital, Avenida Fernando Abril Martorell 106, Valencia 46026, Spain

e Pere Virgili Health Research Institute, University Hospital of Tarragona Juan XXIII, Carrer Dr. Mallafré Guasch, 4, 43007 Tarragona, Spain

Abstract

Although drug-facilitated sexual assault (DFSA) cases account for a significant portion of sexual assaults (SA), their psychological and emotional consequences—beyond PTSD—remain underexplored. The current study addresses this gap by examining the psychopathological symptoms and emotion regulation difficulties in DFSA and non-DFSA survivors, identifying emotional dysregulation as a potential predictor of psychological sequelae. The sample included 39 women SA survivors from a clinical sample who experienced an isolated assault within the past year (20 non-DFSA, 19 DFSA) and 35 control participants comparable in sex, age, nationality, and educational level. To prevent confounding variables, cases with a history of childhood sexual abuse, prior SA, other traumatic events, or pre-existing mental health diagnoses were excluded. The results revealed that, while both survivor groups exhibited higher psychological symptoms than controls (i.e., somatization, obsessive-compulsive, interpersonal sensitivity, depression, hostility, phobic anxiety, and paranoid ideation), the non-DFSA group reported significantly higher anxiety and psychoticism symptoms than the DFSA one. Furthermore, whereas non-DFSA survivors demonstrated greater difficulties than controls in all emotional regulation domains (i.e., lack of emotional control, non-acceptance of emotional distress, daily life interference, inattention to one's emotions, and emotional confusion), the differences in DFSA survivors were restricted to difficulties with non-acceptance of emotional distress. Regression analyses identified non-acceptance of emotional distress and lack of emotional control as key predictors of anxiety and psychoticism in SA survivors. These findings suggest that differences in assault-related contextual factors—such as substance use—may lead to distinct psychological and emotional profiles, although having comparable rates of PTSD. Clinically, the results underscore the importance of tailoring interventions mainly focused on reducing the non-acceptance of emotional distress and enhancing emotional control, as these two components have been identified as significant predictors of anxiety and psychoticism symptoms among both DFSA and non-DFSA survivors.

Keywords: sexual assault, drug-facilitated sexual assault, psychological symptoms, emotional dysregulation, mental health

Introduction

Sexual assault (SA) is one of the most severe forms of interpersonal trauma, involving unwanted, nonconsensual sexual contact through force, incapacitation, or coercion. According to estimates from the United Nations Children's Fund (UNICEF, 2025), approximately 650 million women and girls worldwide have been subjected to sexual violence during childhood. Complementing these data, the World Health Organization (WHO, 2021) reports that around 34% of women aged 15 and older have experienced some form of sexual violence in their lifetime. Recognized as a critical global health issue due to its psychological impact, SA has been strongly linked to a wide range of psychological symptoms beyond posttraumatic stress, including anxiety and depression, disordered eating behaviors, obsessive-compulsive symptoms, and substance use issues (Campbell et al., 2009; Dworkin et al., 2017). One of the primary mechanisms proposed to mediate the development of psychological symptoms following SA is emotional dysregulation (Ouhmad et al., 2023; Ullman et al., 2014). Conceptualized as a multidimensional construct, it encompasses difficulties in identifying and understanding emotions, non-acceptance of negative emotional experiences, impulsive reactions to distress, and limited access to effective regulation strategies (Gratz & Roemer, 2004). The association between emotional dysregulation and psychopathology in SA survivors may be partially explained by the interpersonal nature of the trauma (Messman-Moore et al., 2013), which can severely disrupt survivors' capacity to process and regulate emotional responses adaptively. Critically, psychopathological responses may be shaped by risk contextual factors related to the SA (Campbell et al., 2009), which must therefore be carefully considered given its heterogeneity. Among these factors, drug-facilitated sexual assault (DFSA)—defined as the survivors' incapacitation or inability to consent under the influence of substances—

emerges as particularly relevant, as it may lead to a particular cluster of psychological consequences, given that survivors often report impaired or fragmented trauma memories which may alter how the experience is processed and integrated (Gauntlett-Gilbert et al., 2004). Despite DFSA being a prevalent and increasingly reported subtype of SA (Fields et al., 2022), research has yet to comprehensively examine its full range of psychopathological consequences, particularly concerning emotion dysregulation. Addressing this gap, the present study aims to explore the psychological impact and emotional regulation difficulties in survivors of this specific form of SA and to assess whether difficulties in emotional regulation would predict psychological outcomes.

Psychopathological sequelae of sexual violence

SA is the traumatic event with the most significant impact on mental health compared to other traumas (Dworkin et al., 2017; Lance P. Kelley et al., 2009). Regarding these psychological sequelae, a qualitative review found that 17%–65% of people with a history of SA develop PTSD, 13%–51% meet diagnostic criteria for depression, 12–40% experience symptoms of anxiety, 13–49% develop alcohol use disorders, 28–61% develop drug use disorders, 23–44% experience suicidal ideation, and 2–19% attempt suicide (Campbell et al., 2009). In a recent meta-analysis, Dworkin et al. (2017) confirmed that SA survivors exhibit significantly higher levels of psychopathological symptoms compared to individuals without an SA history. Specifically, SA survivors exhibited particularly high levels of obsessive-compulsive symptoms and trauma- and stressor-related disorders (including PTSD), along with moderately elevated symptoms of anxiety, depression, and bipolar disorders, and, to a lesser extent, increased symptoms of disordered eating and substance use. Critically,

this wide range of psychopathology can vary depending on contextual conditions linked to SA (Campbell et al. 2009), such as the role of substance use during the assault.

The impact of substance use during SA on psychological sequelae remains an underexplored topic, with research limited primarily to PTSD and depression, yielding inconclusive findings. Hence, some studies did not find differences in PTSD severity between DFSA and non-DFSA survivors (Kilpatrick et al., 2007; Littleton et al., 2009), while others consider DF as a risk factor (Jaffe et al., 2017; McConnell et al., 2020) or as a protective factor from PTSD (Fields et al., 2022; Peter-Hagene & Ullman, 2018; Zinzow et al., 2010). As for depressive symptoms, some studies have found no differences between DFSA and non-DFSA survivors (Fields et al., 2022; Kilpatrick et al., 2007; Littleton et al., 2009), while others concluded that DFSA was a protective factor (Zinzow et al., 2010). These inconsistencies may stem from methodological differences among non-DFSA and DSFA groups, including sample type, age range, and control of individual factors (childhood SA, prior non-sexual trauma, sexual revictimization, and pre-existing mental health conditions). Additionally, differences in whether studies account for the voluntary, involuntary, or mixed ingestion of substances may influence posttraumatic psychopathology results, particularly through their impact on self-blame attributions (Fields et al., 2022; Zinzow et al., 2010). Understanding these contextual variables is essential, especially considering that DFSA cases typically involve women in their 30s, are committed by a known perpetrator in nightlife settings in a single episode, and often involve penetration due to incapacitation and memory loss (Recalde-Esnoz et al., 2024). Conversely, non-DFSA includes a wider range of assaults, can be a single or repeated event, and is often linked to childhood SA by someone with a close relationship, leading to greater age variability among survivors (Blake et al., 2014; Testa et al., 2003). In this context, DFSA represents a distinct assault profile

whose specific features may lead to differential psychological outcomes. Consequently, examining the psychological impact of DF among SA survivors requires ensuring comparability in the remaining assault-related factors.

In addition to accounting for contextual factors, it is essential to adopt a dimensional perspective that captures a broader spectrum of psychological symptoms following SA, rather than restricting analyses to the diagnostic boundaries of PTSD. A transdiagnostic approach is particularly relevant, as it facilitates the identification of symptom domains that may be clinically meaningful but remain overlooked when research is limited to categorical diagnoses. Yet, as previously noted, the majority of studies on the psychological sequelae of SA have concentrated almost exclusively on PTSD and depression (Dworkin et al., 2017). Given the distinct characteristics of DFSA—such as memory impairment, loss of control, and heightened self-blame (Fields et al., 2022), it is essential to explore how DFSA affects survivors' mental health beyond PTSD and depression. This includes assessing a wider range of symptoms—such as anxiety, disordered eating, substance use disorders, and suicidal ideation, which are also potential consequences of SA (Dworkin, 2020). Expanding the scope of research in this direction would not only deepen our understanding of DFSA's unique impact but also inform the development of more tailored and effective intervention strategies.

Emotional regulation after sexual violence

Given the profound impact of SA on mental health and the wide-ranging consequences, it is crucial to examine the role of emotion regulation as an underlying mechanism of these mental health disturbances. Emotional dysregulation has been linked to SA due to the interpersonal nature of this trauma, which significantly shapes

the psychopathological manifestation. Despite its importance, prior literature on emotion regulation has been limited to examining the impact of interpersonal trauma in childhood SA, concluding that these types of traumatic events are strongly associated with emotion regulation difficulties (Cloitre et al., 2005; Snow et al., 2022). Conversely, limited research has explored the impact of interpersonal trauma on emotion dysregulation in adult SA survivors, focusing primarily on its role as a risk factor for psychopathology. For instance, Ullman et al. (2014) found in a community sample of adult SA survivors that emotion dysregulation exacerbated depressive and PTSD symptoms of SA when a childhood SA preceded it. However, this study does not allow for isolating the specific impact of a single adult SA on emotion dysregulation, as the participants had been revictimized, which may have affected their mental health consequences. Moreover, the psychopathological consequences are limited to depressive and PTSD symptoms. As for the role of contextual factors such as DFSA, Messman-Moore et al. (2013) examined a sample of college students with SA history and found that emotional dysregulation predicted DFSA revictimization among women with previous episodes of DFSA. Critically, this study primarily focused on understanding how emotion dysregulation contributes to sexual revictimization following DFSA rather than examining the impact of DFSA on emotion dysregulation itself and its potential link to the development of psychopathological sequelae.

The objective of this study is to examine differences in psychological sequelae and emotional dysregulation between DFSA and non-DFSA survivors. To achieve this, a clinical sample of survivors—with and without DF—who experienced a single SA within the past year was recruited. Additionally, a control group comparable in sex, age, ethnicity, and education level was recruited. Only participants with no history of prior SA or other traumatic experiences or pre-existing mental health conditions were

included, as there are potential confounding variables given its association with mental health outcomes (Dworkin, 2020; Tiihonen Möller et al., 2014). The researchers hypothesized that: i) non-DFSA survivors would report more psychological sequelae, as previous research suggests they exhibit higher rates of PTSD and depressive symptoms (Zinzow et al., 2010); ii) emotional regulation difficulties would differ between the two SA groups reflecting the distinct nature of the traumatic experience; iii) emotional dysregulation will mediate the relationship between SA type and psychopathological outcomes, serving as a potential mechanism underlying the development of mental health disturbances. Given its role in exacerbating PTSD and depression (Ullman et al., 2014), it is expected that higher levels of emotional dysregulation will predict greater psychological distress across both groups, though potentially through different pathways.

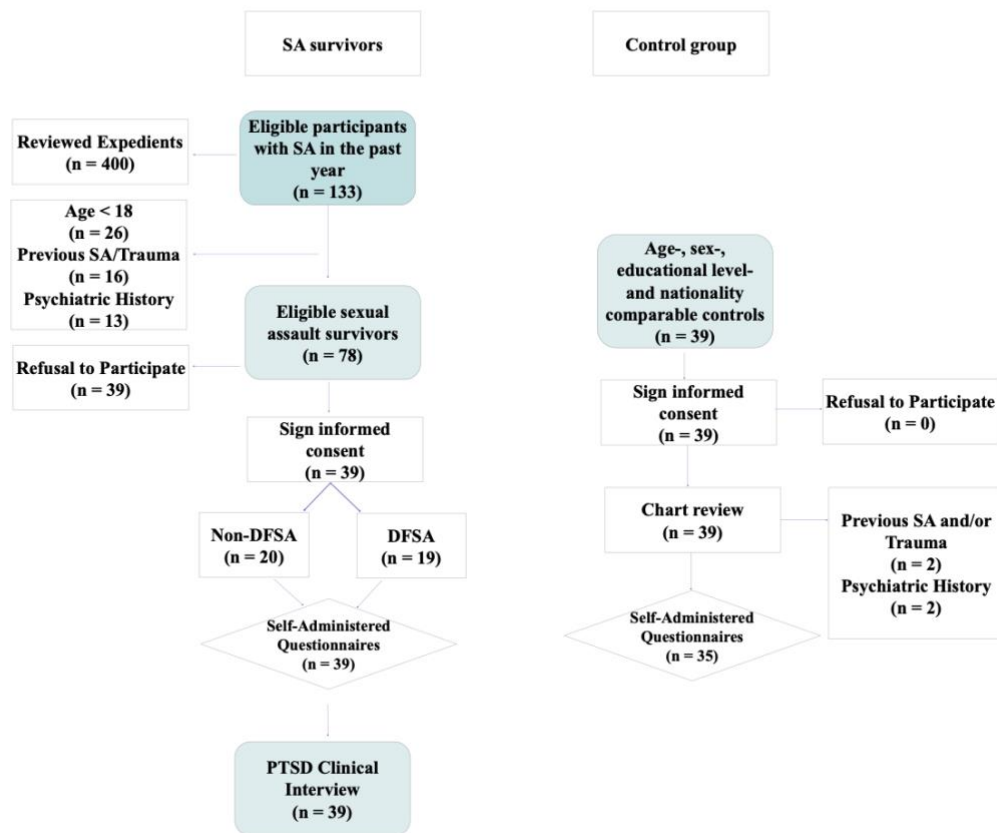
Methods

Participants

Participants were recruited from a public outpatient mental health center specializing in sexual trauma between October 2022 and October 2024. A total of 400 clinical records from individuals receiving services at this center were reviewed. From these, 133 cases involving civilian female survivors were selected in which the assault occurred within the previous 12 months. This inclusion criterion was established to ensure the recency of the traumatic event and to enhance the validity and clinical relevance of symptom assessment specifically related to sexual trauma. After applying exclusion criteria to isolate the specific psychological impact of a single, recent sexual assault in adulthood, minimizing the confounding effects of prior trauma exposure or pre-existing mental health conditions, 39 cases were included in the study. Exclusion

criteria were: (i) being under 18 years old, (ii) having experienced childhood sexual abuse or any prior SA, (iii) exposure to other traumatic events (e.g., environmental disasters, kidnapping, murder of a family member, death threats), and (iv) having a prior diagnosis of a mental disorder. The selected cases were then categorized into two groups: (i) survivors of SA involving verbal coercion, intimidation, or physical force, but without drug-facilitation ($n = 20$) and (ii) survivors of drug-facilitated sexual assault (regardless of whether the ingestion was voluntary or involuntary) ($n = 19$). Additionally, a control group of 39 adult women was recruited through community advertisements. The decision to include a unified group of DFSA survivors was based on their shared legal and clinical outcome of incapacitation and inability to consent, which is often linked to similar psychological sequelae (e.g., memory fragmentation, loss of agency). The control participants were comparable to the survivor group in terms of age, nationality, and educational level. After applying the same exclusion criteria—plus the additional requirement that none had experienced SA—a total of 35 cases were included. An ethics committee approved the study, and all participants provided written informed consent. These clarifications are detailed in Figure 1 to enhance transparency and support generalizability considerations.

Figure 1.
Sample Recruitment Flowchart



Materials

Post-traumatic stress disorder. PTSD symptoms were measured using the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5; Weathers et al., 2018), which assesses 20 items rated on a 0 to 4 severity scale, which provides a total score ranging from 0 to 80. The instrument provides information on the number of symptoms, symptom severity, and whether participants meet diagnostic criteria for PTSD. In the present study, the total scale demonstrated good internal consistency ($\alpha = .899$), aligning with the psychometric properties reported in the initial validation study, which found adequate internal consistency ($\alpha = .88$) and good test–retest reliability ($\kappa = .83$; Weathers et al., 2018).

Psychopathological symptoms. To capture a broader and dimensional profile of psychological symptoms that extends beyond the diagnostic boundaries of PTSD, the self-report questionnaire of Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1994) was administered. It comprises 90 items, each rated on a five-point Likert scale from 0 (Never) to 4 (Always), indicating how frequently the respondent experiences various symptoms. The instrument assesses nine symptom dimensions: somatization (12 items), which evaluates physical distress related to psychological factors; obsessive-compulsive traits (10 items), assessing intrusive thoughts and repetitive behaviors; interpersonal sensitivity (9 items), measuring discomfort in social interactions; anxiety (10 items), capturing excessive worry and physiological arousal; depression (13 items), assessing feelings of sadness and hopelessness; anger-hostility (6 items), evaluating irritability and aggressive tendencies; phobic anxiety (7 items), measuring irrational fears and avoidance behaviors; paranoid ideation (6 items), assessing distrust and suspicion; and psychoticism (10 items), which evaluates disorganized thinking and perceptual distortions, along with an additional category of “extra items” (7 items). The SCL-90-R also generates a Global Severity Index (GSI), which represents the average score across all 90 items and was utilized in the present study. Internal consistency reliability for the SCL-90-R in the current sample was excellent for the Global Severity Index ($\alpha = .98$). Cronbach’s alphas for the subscales were also satisfactory to excellent: Somatization ($\alpha = .92$), Obsessive-Compulsive ($\alpha = .90$), Interpersonal Sensitivity ($\alpha = .87$), Anxiety ($\alpha = .92$), Depression ($\alpha = .92$), Anger-Hostility ($\alpha = .82$), Phobic Anxiety ($\alpha = .89$), Paranoid Ideation ($\alpha = .86$), and Psychoticism ($\alpha = .87$). These results indicate strong internal consistency across all dimensions of the instrument in this sample.

Emotional dysregulation. Difficulties in emotion regulation were assessed using the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), with the

Spanish adaptation by Hervás & Jódar (2008). This 28-item instrument examines various dimensions of emotional regulation. Specifically, it evaluates lack of emotional control (9 items), rejection or non-acceptance of emotional distress (7 items), daily life interference, including difficulties with concentration and task performance (4 items), challenges in identifying and attending to one's emotions (4 items), and emotional confusion (4 items). Each item is rated on a 5-point Likert scale, ranging from 1 (almost never) to 5 (almost always), yielding a total score between 28 and 140. Higher scores indicate greater difficulties in emotion regulation. In the present study, the internal consistency of the total scale was excellent ($\alpha = .952$). Internal consistency for the subscales was also adequate to excellent: lack of emotional control ($\alpha = .908$), non-acceptance of emotional distress ($\alpha = .925$), interference ($\alpha = .906$), inattention to emotions ($\alpha = .848$), and emotional confusion ($\alpha = .825$).

Procedure

All participants were individually tested in a controlled and quiet room. First, all participants signed the informed consent form and then answered the semi-structured sociodemographic interview. The survivor's group was assessed at the Foundation with whom they had previously made contact. All psychological measures were collected following the assault, as part of the participants' initial clinical evaluation, which took place within the same year of the traumatic event. All participants completed the self-administered questionnaires remotely, although they were scheduled for in-person appointments to undergo additional assessments as part of a broader study.

Data analysis

Data were summarized using means and standard deviations for continuous variables and absolute and relative frequencies for categorical variables. First, two MANOVAs were performed to analyze the SCL-90 subscales (Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism) and the DERS subscales (Lack of Emotional Control, Non-acceptance of emotional distress, Daily Life Interference, Inattention to one's emotions, and Emotional Confusion), with Group (non-DFSA, DFSA, control) as the between-subjects factor. Second, linear regression models were conducted for each SCL-90 dimension, as well as for PTSD symptom count and severity derived from the CAPS-5, in cases where significant differences were observed between the non-DFSA and DFSA groups. The DERS subscales were entered as potential predictors of mental health symptoms among SA survivors. All statistical analyses were conducted using SPSS (version 30.0.0).

Results

Sociodemographic details are presented in Table 1. The sample consisted of 74 participants divided into three groups: survivors of non-DFSA ($N = 20$), survivors of DFSA ($N = 19$), and a control group ($N = 35$). The groups were comparable in sex, age, educational level, and nationality (all $ps > .069$). Among the DFSA group, 31.6% reported voluntary substance intake, 15.8% involuntary intake, and 53.6% a mixed intake; most reported mixed ingestion (e.g., alcohol and other substances). Memory impairment also varied significantly ($p = .037$), with the DFSA group showing a higher proportion of survivors with no or partial memories. Conversely, the survivor groups were comparable in terms of the type of assault, time since the assault, and relationship

with the aggressor (all $ps > .13$). Additionally, both survivor groups met criteria for PTSD and exhibited a similar number of PTSD symptoms based on the CAPS-5 (all $ps > .09$). However, the non-DSFA group showed significantly greater PTSD symptom severity compared to the DSFA group ($p = .03$).

Table 1.

Sociodemographic details for non-DSFA survivors, DSFA survivors, and the control group

	Non-DSFA(n= 20)	DSFA(n= 19)	Control (n= 35)	p
Females (n)	20	19	35	
Age	25.3 (7.29)	30.2 (8.81)	24.8 (5.17)	.069
Education (n)				.172
Primary studies	3	1	0	
Secondary studies	6	5	14	
University Studies	11	13	21	
Nationality (n)				.087
European	15(75%)	12(63.2%)	31(88.6%)	
Latin American	5(25%)	7(6.8%)	4(11.4%)	
Sexual Orientation (n)				.778
Heterosexual	16(80%)	15(78.9%)	30(85.7%)	
Homosexual	0	0	0	
Bisexual	4(20%)	4(21%)	5(14.3%)	
Religion (n)				.404
Believer	9(45%)	10(52.6%)	12(34.3%)	
Non-believer	11(55%)	9(47.4%)	23(65%)	
Marital Status (n)				.523
With a partner	8(40%)	7(36.8%)	18(51.4%)	
Without a partner	12(60%)	12(63.2%)	17(48.6%)	
Type of Sexual Assault (n)				.2
With penetration	8(40%)	15(78.9%)		
Without penetration	12(60%)	4(21.1%)		

Time since de assault	10.10(7.23)	8.58(5.75)	.475
Injuries after Sexual Assault (n)			.345
Severe (fractures, vaginal/anal tears)	4(20%)	2(10.5%)	
Mild (contusions)	9(45%)	6(31.6%)	
No injures	7(35%)	11(57.9%)	
Type of intake (n)			<.001
Voluntary intake	0	6(31.6%)	
Involuntary intake	0	3(15.8%)	
Mixed intake	0	10(53.6%)	
No intake	20(100%)	0	
Substance Ingested			
Alcohol		7(36.8%)	<.001
Other substances (drugs or medication)		3(15.8%)	
Mixed substances		9(47.4%)	
Report (n)	16(80%)	15(78.9%)	.935
Pregnancy (n)	0	0	
Memory of the assault			.037
No memories	3(15%)	8(42.1%)	
Partial memories	5(25%)	7(36.8%)	
Full memory	12(60%)	4(21.1%)	
Number of therapy sessions	4.4 (4.45)	2.36 (5.49)	.00
Number of perpetrators	1 (0.00)	1.15 (0.37)	.00
Age of agressors	32.35 (13.56)	28.84 (14.69)	.00
Nationality of perpetrators (n)			.15
Same as the survivor	14(70%)	6(31.6%)	
Different from the survivor	6(30%)	13(68.4%)	
Male perpetrators (n)	20 (100%)	19(100%)	

Relationship with the perpetrator (n)			.13
Stranger	4(20%)	5(26.3%)	
Recent acquaintance	7(35%)	11(57.9%)	
Intimate relationship	9(45%)	3(15.8%)	
Scenario of the assault (n)			.33
Private	13(65%)	15(78.9%)	
Public	7(35%)	4(21.1%)	
Percived psychological consequences (n)	16(80%)	16(84.2%)	.73
Sexually transmitted infections (n)	5(25%)	3(15.8%)	.47

DFSA = drug-facilitated sexual assault; SA= sexual assault; PTSD = Post-traumatic stress disorder; CAPS-5: Clinician-Administered PTSD Scale for DSM-5

Note. Data are expressed as frequencies (*n*) or as means (*M*) followed by standard deviations (*SD*).

Table 2 presents the SCL-90 scores and the DERS scores in each group.

Table 2.

Psychopathological symptoms (SCL-90-R) and emotional dysregulation (DERS) in non-DFSA survivors, DFSA survivors, and the Control group

SCL-90-R	Non-DFSA (N=20)	DFSA (N=19)	Control (N=35)
Somatization	2.26(0.98)	2.04(0.77)	0.88(0.62)
Obsessive-Compulsive	2.69(0.69)	2.24(0.95)	1.41(0.75)
Interpersonal Sensitivity	2.27(0.82)	1.81(0.87)	0.97(0.72)
Anxiety	2.84(0.82)	2.11(0.87)	1.00(0.7)
Depression	2.79(0.84)	2.20(0.71)	1.19(0.77)
Anger-Hostility	1.18(1.03)	1.06(0.82)	0.49(0.45)
Phobic Anxiety	2.31(0.92)	1.87(0.85)	0.46(0.51)
Paranoid Ideation	2.28(0.88)	1.77(0.93)	1.87(0.85)
Psychoticism	2.00(0.8)	1.32(0.82)	0.62(0.57)
Global Severity Index	2.37(0.69)	1.91(0.65)	0.91(0.55)
DERS			
Confusion	11.60(3.81)	10.32(4.21)	8.67(3.14)

Inattention	12.20(3.99)	9.74(4.10)	2.33(3.54)
Non-acceptance	24.55(8.32)	22.05(6.87)	16.14(7.38)
Interference	14.60(4.17)	13.63(4.78)	11.22(4.16)
Lack of control	24.60(5.88)	22.32(10.21)	17.19(8.22)

DFSA = drug-facilitated sexual assault; SCL-90-R = Symptom Checklist-90-Revised;
DERS = Difficulties in Emotion Regulation Scale

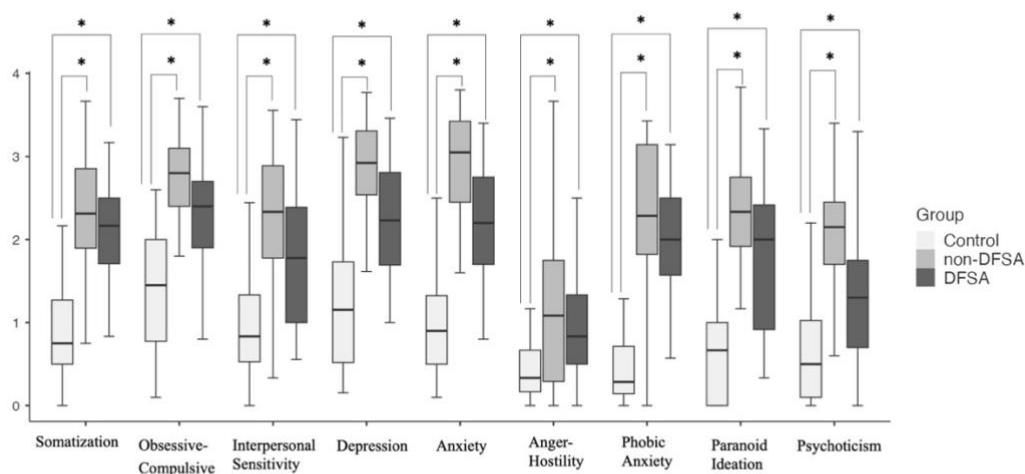
Note. Data are presented as means (M), with standard deviations (SD) shown in parentheses.

Psychopathological symptoms in SA survivors

The MANOVA for SCL-90 subscales showed a significant group effect, *Pillai's trace* = .814, $F(18, 130) = 4.95$, $p < .001$. All SCL-90 subscales showed differences among groups (all $ps < .002$). Bonferroni pair comparison indicates that both non-DFSA and DFSA groups have higher symptomatology than the control group in all areas (all $ps < .20$). However, when SA groups are compared, non-DFSA survivors showed higher symptoms than DFSA ones in Anxiety ($p = .016$) and Psychoticism ($p = .013$). See Figure 2 for the comparison of the SCL-90 subscales across groups.

Figure 2.

Boxplot for the mean of psychological symptoms assessed (SCL-90-R) for the control group, non-DFSA survivors, and DFSA survivors



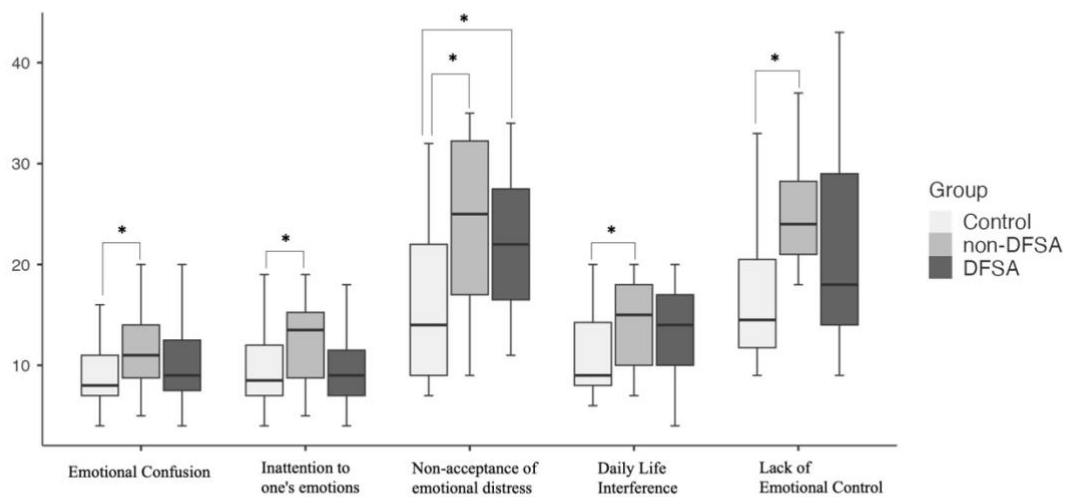
DFSA = drug-facilitated sexual assault; SCL-90-R = Symptom Checklist-90-Revised

Note: Bars represent mean values; error bars indicate the standard error of the mean. Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

The MANOVA for DERS subscales also showed a significant group effect ($Pillai's\ trace = .271, F(10, 132) = 2.07, p = .031$). All DERS subscales showed differences among groups (all $ps < .031$). Bonferroni pair comparison indicates that while the non-DFSA group showed worse functioning in all DERS subscales than the control group (all $ps < .031$), the DFSA group only showed worse functioning in the Non-acceptance of Emotions domain ($p = .020$). No other significant differences were found (all $ps > .121$). See Figure 3 for the comparison of the DERS subscales across groups.

Figure 3.

Boxplot for the mean of emotional dysregulation domains (DERS) for the control group, non-DFSA survivors, and DFSA survivors



DFSA = drug-facilitated sexual assault; DERS = Difficulties in Emotion Regulation Scale

Note: Bars represent mean values; error bars indicate the standard error of the mean. Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

Assumptions for both MANOVA analyses were evaluated and found to be adequately met. For the first MANOVA, Box's M test indicated homogeneity of variance-covariance matrices, $p = .172$. Bivariate correlations among dependent variables ranged from $r = .509$ to $.858$, a moderate to strong association consistent with MANOVA requirements. For the second MANOVA, Box's M was also non-significant,

$p = .011$, and correlations ranged from $r = .331$ to $.792$, again supporting the suitability of the analysis. In both cases, inspection of Q–Q plots suggested that the assumption of multivariate normality was reasonably satisfied.

Emotional regulation domains as risk factors of psychopathological symptoms in SA survivors

A significant regression model was found for the Anxiety SCL-90 subscale, $F(2, 35) = 19.86, p < .001, R^2 = .53, R^2_{Adjusted} = .51$. The analysis indicated that anxiety symptomatology was predicted by $+.26, +.05$ lack of emotional control, and $+.04$ Non-acceptance of Emotions. Similarly, a significant regression model was found for Psychoticism SCL-90 subscale, $F(2, 35) = 6.56, p < .001, R^2 = .45, R^2_{Adjusted} = .42$. The analysis indicated that psychoticism symptomatology was predicted by: $-.31, +.04$ lack of emotional control, and $+.04$ Non-acceptance of Emotions.

An additional regression analysis was conducted to examine whether emotion regulation difficulties predicted PTSD symptom severity, given the differences observed between survivor groups. The results revealed a significant model, $F(1, 36) = 15.65, p < .001, R^2 = .30, R^2_{Adjusted} = .28$. Specifically, higher levels of non-acceptance of emotions significantly predicted greater PTSD symptom severity, with the regression equation: PTSD severity = $16.22 + .94 \times$ Non-acceptance of Emotions.

Discussion

The present study aims to examine the psychological sequelae and the impact of SA on emotional regulation in DFSA and non-DFSA survivors. Although both non-DFSA and DFSA groups exhibited higher symptomatology than the control group in all areas, when SA groups were compared, non-DFSA survivors showed higher symptoms

of anxiety and psychoticism compared to DFSA ones. Regarding emotion regulation, non-DFSA survivors demonstrated worse emotional regulation than controls in all domains, whereas DFSA survivors only exhibited worse functioning in non-acceptance of emotional distress. Furthermore,, emotional regulation difficulties —particularly non-acceptance of emotional distress and lack of emotional control— were identified as key predictors of anxiety and psychoticism in SA survivors. The following sections will provide a more in-depth discussion of each outcome.

Psychopathological sequelae in DFSA and non-DFSA survivors

Regarding psychological sequelae, our results are aligned with those that found that SA has a significant impact on survivors' mental health (Campbell et al., 2009; Dworkin et al., 2017), as both non-DFSA and DFSA survivors reported higher psychopathological symptoms than the control group. Specifically, survivors of an SA experienced more symptoms of somatization, obsessive-compulsive tendencies, interpersonal sensitivity, anxiety, depression, hostility, phobic anxiety, paranoid ideation, and psychoticism than controls. Notably, when both non-DFSA and DFSA survivors were compared, non-DFSA survivors exhibited significantly higher levels of anxiety—characterized by excessive worry and heightened physiological arousal—and psychoticism, which encompasses disorganized thinking and perceptual distortions. One explanation for these differences is that DFSA survivors, due to the effects of substances during the assault, may experience memory impairments (Recalde-Esnoz et al., 2024), which could result in a less intense immediate emotional response. In contrast, non-DFSA survivors, who experience the assault without the mitigating effects of substances, may process it with full consciousness, leading to a vivid, coherent encoding of the traumatic event that can trigger a more intense and prolonged stress

response. The heightened recollection of traumatic details may amplify the overall emotional impact, resulting in higher reported levels of anxiety and psychoticism. Critically, although groups met PTSD criteria at comparable rates based on CAPS-5, the non-DSFA group reported greater PTSD symptom severity as well as a larger range of psychological symptoms. This distinction underscores a key limitation in relying solely on diagnostic thresholds, as such criteria may mask important differences in clinical spectrum and functional impact. Taken together, these findings highlight the importance of broadening the scope of psychological outcomes beyond categorical PTSD diagnostic frameworks and incorporating dimensional assessments when examining the mental health consequences of SA. As suggested by Dworkin et al. (2017), expanding the scope of assessment beyond PTSD criteria is essential for capturing the full spectrum of trauma-related responses, particularly in cases involving DS, as substance-related memory impairments may alter how trauma is processed and experienced over time, potentially leading to a distinct psychological profile.

Emotional regulation in DFSA and non-DFSA survivors

Concerning emotional regulation, while non-DFSA survivors demonstrated worse results than controls in confusion, inattention, interference, and lack of emotional control, DFSA survivors only exhibited worse functioning in non-acceptance of emotional distress, suggesting that distress intolerance may be a core regulatory challenge in SA survivors regardless of assault characteristics. The non-DFSA group's worse functioning across all domains, compared to the DFSA group, may be explained by differences in how each group processes and remembers the assault. Non-DFSA survivors likely retain a more precise and more coherent memory of the event, as they experienced the trauma without substances. This vivid recollection can overwhelm the

regulatory system, leading to widespread difficulties across all domains of emotion regulation. In contrast, DFSA survivors often have fragmented or impaired memory of the event caused by substances, which might permit the preservation of certain emotional regulation functions. Nevertheless, memory fragmentation prevents the formation of a coherent trauma narrative, leading to persistent uncertainty and ambivalence toward negative emotions, which can make it harder to accept and process distress related to the traumatic event. Additionally, the circumstances of DFSA—which, along with the use of substances, is often accompanied by stigma (Littleton et al., 2009; Stewart et al., 2024)—can amplify feelings of guilt, shame, and self-blame. These intense negative emotions around DFSA may further contribute to a tendency to reject or avoid distress at similar levels to non-DFSA survivors, even in the absence of vivid traumatic memories. Thus, although other domains of emotion regulation remain relatively preserved in DFSA survivors, the difficulty in accepting emotional distress emerges as a central issue due to the dissonance between their fragmented traumatic experience and the need to integrate conflicting negative emotions. In conclusion, while full awareness during non-DFSA leads to broader regulatory impairments, the unique context of DFSA spares some domains yet leaves distress intolerance as a critical common deficit.

Association between psychological symptomatology and emotional regulation after sexual assault

As for the relationship between psychological symptoms and emotional regulation in SA survivors, our results are aligned with previous research highlighting emotional dysregulation as a key predictor of psychological symptoms development after an SA (Ullman et al., 2014). More precisely, our findings suggest that non-

acceptance of emotional distress is a significant predictor of anxiety and psychotic symptoms, as well as PTSD symptom severity in SA survivors, whereas impaired emotional control contributes to anxiety and psychotic symptoms but not to PTSD severity. One explanation for this is that non-acceptance of negative emotions may involve maladaptive coping strategies (e.g., rumination or suppression) which in turn heightens anxiety by increasing physiological arousal and stress responses. Moreover, when negative emotions are rejected rather than processed, they may accumulate and manifest as intrusive thoughts, confusion, or dissociative experiences, increasing vulnerability to symptoms like disorganized thinking and perceptual distortions. Thus, the persistent non-acceptance of distress may amplify core features of post-traumatic suffering, including the severity of PTSD symptoms. Simultaneously, a lack of emotional control—often characterized by impulsivity and difficulty managing intense emotions—can heighten emotional reactivity and increase anxiety symptoms by impairing the survivor’s ability to regulate emotional and physiological responses to stress. Without effective regulation, negative emotions can escalate rapidly, amplifying arousal and worry, which in turn reinforces anxious states. Moreover, impulsivity may destabilize cognitive functioning, contributing to psychotic-like symptoms such as fragmented thinking and perceptual distortions. Therefore, the interaction between these factors suggests that survivors with difficulties in accepting emotional distress—both DFSA and non-DFSA ones— while also lacking emotional control, may experience a compounded effect, where persistent anxiety exacerbates cognitive instability, increasing the risk of psychotic-like experiences. For its part, Ullman et al. (2014) concluded that emotional dysregulation is a predictor factor for developing PTSD and depressive symptoms in a women's community sample with a history of SA. Despite these valuable findings, the inclusion of participants with prior trauma histories may

have confounded the results, making it difficult to isolate the specific impact of the assault in question. Furthermore, the study did not explore the specific impact of distinct emotional regulation domains on mental health outcomes, as it focused solely on depression and PTSD, overlooking the broader spectrum of psychological difficulties that survivors of SA may experience. Taken together, these findings underscore the importance of examining nuanced dimensions of emotional regulation and their unique contributions to diverse psychological outcomes in both DFSA and non-DFSA survivors.

Limitations and strengths of the study

Despite these interesting results, our study has several limitations. Firstly, although the exclusion criteria yielded a highly specific sample, the findings may limit the generalizability of the findings to survivors with more complex or chronic victimization histories. Despite this, excluding histories of childhood, prior adult SA, and other traumatic experiences allowed for a more direct examination of the effects of substance involvement in recent, isolated SA while controlling for confounding factors, thereby enhancing its internal validity and enlarging the knowledge about this under-researched population. Secondly, due to the rigorous exclusion criteria, the sample size was relatively small. Nevertheless, our findings demonstrated robust and clinically meaningful effects. Multivariate analyses showed large (SCL-90) and medium (DERS) effect sizes, and regression models explained substantial variance in anxiety and psychoticism symptoms ($R^2 = .53$ and $.45$, respectively). Thirdly, another consequence of the limited sample size was the inability to perform more fine-grained subgroup analyses, such as exploring differences between voluntary and involuntary substance ingestion in DFSA cases, which would have compromised statistical power, limiting the

robustness and interpretability of the findings. Fourthly, an additional limitation concerns the sociodemographic composition of the sample, which consisted predominantly of participants of European descent. While this reflects the population served by the clinical setting where data were collected, it may limit the applicability of the findings to survivors from other ethnic and cultural backgrounds, which may shape both emotional regulation strategies and the expression of psychological symptoms (Schunk et al., 2022). Finally, although the CAPS-5 was administered by a trained clinical psychologist, dimensional psychological symptoms and emotional dysregulation were assessed through self-reports, which may be subject to social desirability effects. Nevertheless, we employed standardized and validated measures, ensuring consistency in responses across participants. Future research should involve larger and more diverse samples to examine potential differences between voluntary and involuntary substance use, assess the generalizability of findings to survivors with chronic victimization histories or from diverse ethnic and cultural backgrounds, and employ multimethod assessment approaches—such as structured clinical interviews, observational measures, or collateral reports—to more accurately capture the multifaceted nature of trauma-related psychopathology.

Despite these limitations, this study offers valuable insights into the impact of DF on survivors' mental conditions, employing a novel design that considers DFSA survivors as a distinct group. A key strength of our methodology is the use of the CAPS-5, which ensured that PTSD was assessed via a structured clinical interview rather than relying solely on self-report, thereby enhancing diagnostic reliability and reducing variability. At the same time, recognizing that the CAPS-5 may not fully capture the complexity of trauma-related presentations—particularly in atypical or overlapping cases (Ruglass et al., 2020), as frequently observed in DFSA—we

integrated complementary and more inclusive assessments. This dual strategy allowed us not only to establish a reliable PTSD diagnosis but also to broaden the scope of evaluation toward transdiagnostic domains, moving beyond prior research that has largely restricted its focus to PTSD and depression. By examining a wider spectrum of psychological symptoms, our study offers a more comprehensive picture of survivors' mental health. Finally, rather than assessing overall emotional dysregulation as a single, global construct, we investigated specific domains of emotional regulation and analyzed how each of them relates to different psychological outcomes. This approach strengthens the specificity of our findings and provides valuable insight into the mechanisms linking emotional dysregulation with mental health conditions following SA.

Conclusions and implications

In conclusion, although both SA survivor groups meet PTSD criteria at similar rates, non-DFSA survivors report significantly higher levels of anxiety and psychoticism compared to their DFSA counterparts. Moreover, whereas non-DFSA survivors have broader difficulties across all emotional regulation domains than the control group, DFSA survivors primarily struggle with non-acceptance of emotional distress. Additionally, non-acceptance and lack of emotional control emerged as key predictors of anxiety and psychoticism symptoms in SA survivors. These findings carry important clinical and theoretical implications, highlighting the importance of broadening the scope beyond PTSD and depression to offer a greater understanding of survivors' mental health. Practically, our results may inform the development of more tailored therapeutic interventions that address the unique emotional regulation mechanisms underlying psychological sequelae in each survivor profile. For this reason,

therapeutic interventions for SA survivors—both DFSA and non-DFSA—could benefit from a specific focus on emotional dysregulation, particularly targeting non-acceptance of emotional distress and lack of emotional control, as these domains have been identified as key predictors of psychological symptoms.

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Annexe 3. A Dimensional Approach to PTSD after Drug-Facilitated Sexual Assault: Impact on Sexual Functioning

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A Dimensional Approach to PTSD after Drug-Facilitated Sexual Assault: Impact on Sexual Functioning

Marta Lizarán^{a,b} (marta_lizaran@iislafe.es)
ORCID: 0000-0003-1319-6922

Adrián Torres-Villasante^c (adrian.torres@iispv.cat)

Julia Andreu Martínez^d (andreu_julia@gva.es)
ORCID: 0000-0001-7535-4485

Nadina Gómez-Merino^e (nadina.gomez@uv.es)
ORCID: 0000-0001-9234-406X

Javier Sánchez-Ruiz^a (javier_sanchez@iislafe.es)
ORCID: 0009-0002-9906-6167

Alba Moreno-Giménez^{a,b} (alba_moreno@iislafe.es)
ORCID: 0000-0003-4483-6101

Belén Almansa^{a,b} (belen_almansa@iislafe.es)
ORCID: 0009-0004-1699-0368

Ana García-Blanco^{a,d} (ana.garcia-blanco@uv.es)
ORCID: 0000-0002-7840-000X

AUTHOR RESPONSIBLE FOR CORRESPONDANCE:
Ana García-Blanco^{a,d} (ana.garcia-blanco@uv.es) / +34 961244000
ORCID: 0000-0002-7840-000X

AFFILIATIONS

a Mental Health Research Group, Health Research Institute La Fe, Avenida Fernando Abril Martorell 106, Valencia 46026, Spain

b Department of Personality, Evaluation and Psychological Treatment, Faculty of Psychology, University of Valencia, Av. Blasco Ibáñez, 21, 46010, Valencia, Spain

c Pere Virgili Health Research Institute, University Hospital of Tarragona Juan XXIII, Carrer Dr. Mallafré Guasch, 4, 43007 Tarragona, Spain

d Department of Psychiatry and Clinical Psychology, La Fe University and Polytechnic Hospital, Avenida Fernando Abril Martorell 106, Valencia 46026, Spain

e ERI-Lectura, Faculty of Psychology, University of Valencia, Av. Blasco Ibáñez, 21, 46010, Valencia, Spain

Abstract

Sexual assault (SA) is linked to both posttraumatic stress disorder (PTSD) symptoms and sexual functioning (SF) difficulties, but the specific impact of drug-facilitated sexual assault (DFSA) remains unclear. This study examined PTSD symptom severity and SF impairments in DFSA and non-DFSA survivors, exploring PTSD symptoms as predictors of SF decline. 39 women who experienced an isolated SA within the past year (20 non-DFSA, 19 DFSA) and 35 control participants were recruited, excluding cases with previous SA, trauma, or mental health diagnoses. Both survivor groups met PTSD criteria at similar rates, but DFSA survivors showed fewer and less severe symptoms, particularly in reexperiencing, distress, avoidance, and dissociation. Survivors reported significant reductions in sexual functioning after SA. Regression analyses identified negative cognitions and mood, and hyperarousal as key predictors of decline in desire, pleasure, and orgasm, though not arousal. Results confirm the strong link between PTSD and SF difficulties and suggest that DFSA survivors may show a distinct PTSD symptom profile. Critically, symptoms shared by both groups (i.e., negative cognitions and mood and hyperarousal) were associated with SF deterioration. Tailored clinical interventions addressing these symptoms are needed, and future research should examine cognitive and emotional mechanisms underlying SF issues in SA survivors.

Keywords: Sexual Assault, DFSA, PTSD, Sexual Functioning

1. Introduction

Sexual assault (SA)—defined as unwanted, nonconsensual sexual contact achieved through force, incapacitation, and/or coercion—is one of the most prevalent and severe forms of interpersonal trauma. According to estimates from the United Nations Children’s Fund (UNICEF, 2025), approximately 650 million women and girls worldwide have been subjected to sexual violence during childhood. Complementing these data, the World Health Organization (WHO, 2021) reports that around 34% of women aged 15 and older have experienced some form of sexual violence in their lifetime. Due to its physical and psychological consequences, SA is recognized as a critical global health issue. Besides sexual functioning (SF) difficulties, such as reduced desire and interest in sex, problems with arousal and orgasm, or lubrication issues (Högbeck & Möller, 2022; Weaver, 2009), SA is widely regarded as the interpersonal traumatic event most strongly linked to post-traumatic stress disorder (PTSD), often involving reexperiencing symptoms such as flashbacks or nightmares related to the trauma memory (Dworkin et al., 2023). However, not all SA survivors have a vivid trauma experience. Beyond the dissociative amnesia, frequently observed in SA survivors, those with a drug/alcohol-facilitated SA (DFSA) often experience impaired trauma memory due to the physiological effects of the substances. DFSA has been defined as an SA that is facilitated by the survivor being rendered incapacitated or unable to consent due to the voluntary or involuntary ingestion of a substance such as alcohol or drugs (Gauntlett-Gilbert et al., 2004). Despite being a common and increasingly reported subtype of SA (Fields et al., 2022), DFSA consequences remain under-researched (Littleton et al., 2009). This study explores differences in PTSD symptoms and post-assault SF between DFSA and non-DFSA survivors.

Up until this point, the available research indicates that DFSA is more likely to occur among women around the age of 30 and is typically committed by men known to the survivors, often in a nightlife context, and in a single episode. Additionally, DFSA is more likely to culminate in a sexual assault with penetration due to incapacitation and memory loss (Recalde-Esnoz et al., 2024). Conversely, non-DFSA encompasses a wider variety of assault types, ranging from unwanted touching to SA involving physical force or coercion and occurring either as a single episode or through repeated victimization. Notably, adult non-DFSA is often linked to childhood SA victimization (Testa et al., 2003), resulting in a greater variability in survivors' age. Additionally, non-DFSA is frequently perpetrated by someone known to the survivor (Blake et al., 2014). Consequently, to examine the psychological consequences of both types of SA, the assault-related factors should be comparable.

Studies on PTSD indicate that 36% of SA survivors meet the criteria for lifetime PTSD. Moreover, PTSD symptoms can persist and are influenced by repeated victimization over two years (Dworkin, 2020). Hence, proximal assaults, rather than distal ones, are particularly critical for understanding psychological outcomes (Ullman, 2016). Beyond temporal proximity to trauma, the severity and persistence of PTSD can also be explained by the heterogeneity of assault-related factors (Dworkin et al., 2017), emphasizing the need to understand these factors for tailoring interventions and improving outcomes for survivors. The ecological model proposed by Campbell et al. (2009) highlights the interaction of individual and contextual factors that exacerbate posttraumatic symptoms. Among individual factors, a history of prior victimizations and pre-existing mental health conditions are strongly associated with more severe PTSD symptoms (Tiihonen Möller et al., 2014). Contextual contributors, such as perceived life threats during the assault, physical injuries, and the nature of the survivor-

perpetrator relationship, also play significant roles in shaping post-assault psychopathology. The role of substance use during the SA on PTSD is a scarcely investigated topic and remains inconclusive. Some studies consider DF as a risk factor (Jaffe et al., 2017; McConnell et al., 2020) or as a protective factor from PTSD (Peter-Hagene & Ullman, 2018; Zinzow et al., 2010), while others did not find differences in PTSD between DFSA and non-DFSA survivors (Kilpatrick et al., 2007; Littleton et al., 2009; Fields et al., 2022). Among the studies identifying DFSA as a risk factor for PTSD, Jaffe et al. (2017) found that, among a women community sample, those who had experienced a DSFA, showed higher PTSD severity overall. Likewise, McConnell et al. (2017) found similar findings with a community sample of DFSA survivors following a forcible assault. As for the studies that reveal DFSA as a protective factor for PTSD, Peter-Hagene and Ullman (2018) found in a women's community sample that those who had been drinking before the SA presented less PTSD symptoms severity than those who had not. Similarly, Zinzow et al. (2010) found in a community sample that PTSD risk was higher in non-DFSA than in DFSA when the ingestion was voluntary but not when it was involuntary. Critically, when specific symptom PTSD clusters were assessed additional differences between DFSA and non-DSFA survivors can emerge. For instance, Fields et al. (2022) conducted a retrospective chart review of SA survivors in an outpatient trauma center. While overall PTSD levels were comparable between DFSA and non-DFSA survivors, the DFSA group showed fewer dissociation symptoms and less depersonalization than the non-DFSA group. The inconsistencies among these studies may stem from methodological differences, including sample type, age range, and control of individual factors (childhood SA, prior non-sexual trauma, sexual revictimization, and pre-existing mental health conditions).

Sexual functioning (SF) difficulties are also a common consequence of SA (Van Berlo & Ensink, 2000). Compared to women without a history of SA, survivors report lower sexual desire, greater difficulties with arousal and orgasm, and reduced sexual satisfaction (Kelley & Gidycz, 2019; Turchik & Hassija, 2014). These findings could suggest that trauma—regardless of its nature— disrupts SF. However, further evidence pointed out that SF problems are four times more likely following sexual trauma than non-sexual trauma (Haase et al., 2009). Studies on female veterans highlight that sexual trauma, rather than non-sexual trauma, is more strongly associated with lower sexual satisfaction (DiMauro et al., 2018) and a higher likelihood of meeting diagnostic criteria for sexual dysfunction disorder, including sexual desire and arousal disorder (Turchik, 2012). Furthermore, SF can persist for years after the SA (Becker et al., 1984; Ensink et al., 2000; Nadelson et al., 1982; Norris & Feldman-Summers, 1981) and tends to be more severe in survivors with multiple episodes (Becker et al., 1984; Öberg et al., 2002). Several studies have examined the mediating role of PTSD in the relationship between SA and SF difficulties (Letourneau et al., 1996; O’Driscoll & Flanagan, 2016). Högbeck and Möller (2022) found that the risk of impaired SF was higher among a clinical sample of rape survivors with PTSD after controlling for preexisting psychiatric morbidity and previous SA. However, this research assessed PTSD in a categorical variable (PTSD/non-PTSD), while research suggests that specific PTSD symptom clusters may differentially impact SF. In a sample of female veterans, Schnurr et al. (2009) found that hyperarousal symptoms were particularly associated with poor sexual satisfaction. Similarly, in a college women non-clinical sample who reported SA, Kelley and Gidycz (2019) found that greater reexperiencing symptoms were associated with orgasm difficulties. Taken together, these results point to a notable association between SA, SF, and PTSD.

Despite growing evidence on the impact of SA on SF and the mediating role of PTSD, the specific consequences of DFSA remain largely unexplored. Unlike other forms of SA, which are often linked to traumatic memory or in which survivors may have a vivid experience of trauma, DF introduces additional underlying mechanisms closely associated with SF difficulties, such as the feeling of guilt for putting oneself in a higher-risk situation (Peter-Hagene & Ullman, 2018), a heightened confusion and a profound perception of loss of control. This sense of powerlessness may intensify distress in intimate relationships, reinforcing negative cognitive appraisals of one's body and sexuality (Schalk et al., 2023). As a result, while DFSA may lead to SF difficulties similar to those observed in non-DFSA survivors, the underlying cognitive and emotional mechanisms may differ. Therefore, investigating SF in DFSA survivors is essential for understanding the broader psychological impact of this specific trauma, developing targeted interventions, and improving therapeutic outcomes.

The objective of this study is to examine differences in PTSD symptoms and pre-/post-assault SF between DFSA and non-DFSA survivors while controlling for both individual and contextual factors. To achieve this, a clinical sample of survivors—with and without DF—who experienced a single SA within the past year was recruited. Only survivors with no history of prior SA or other traumatic experiences or pre-existing mental health conditions were included. Additionally, a control group comparable in sex, age, ethnicity, and education level was recruited. The study's hypotheses are as follows: i) both SA groups will meet PTSD criteria at similar levels, but they will exhibit distinct symptom clusters (see Fields et al., 2022, on a clinical sample); ii) both SA groups will experience a decline in SF post-assault, as it is a well established consequence after a sexual trauma (Van Berlo and Ensink, 2000); iii) specific PTSD

symptom clusters will predict particular SF impairments in SA survivors (see Högbeck & Möller, 2022; Schnurr et al., 2009; Kelley et al., 2019).

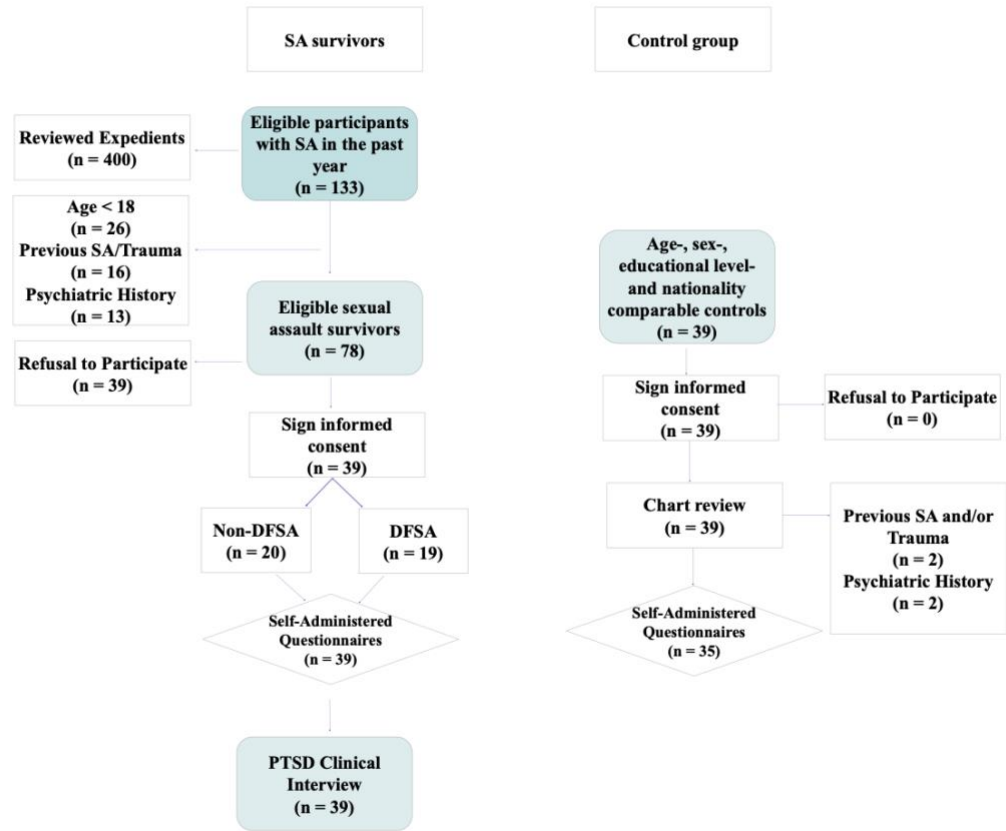
2. Methods

2.1. Participants

Participants were recruited between October 2022 and October 2024 from a public outpatient mental health center specializing in sexual trauma, which serves as the reference center for the entire region, covering a catchment area of approximately 5.4 million people. A total of 400 clinical records from individuals receiving services at this center were reviewed. From these, 133 cases involving civilian female survivors were selected in which the assault occurred within the previous 12 months. This inclusion criterion was established to ensure the recency of the traumatic event and to enhance the validity and clinical relevance of symptom assessment specifically related to sexual trauma. After applying exclusion criteria, 39 cases were included in the study. The exclusion criteria were: (i) being under 18 years old, (ii) having experienced childhood sexual abuse or any prior sexual assault (to avoid the influence of early traumatic experiences on PTSD symptoms and SF, as these are well-established confounding factors), (iii) exposure to other traumatic events (e.g., environmental disasters, kidnapping, murder of a family member, death threats), and (iv) having a prior diagnosis of a mental disorder. The selected cases were then categorized into two groups based on clinical records completed by trained professionals and supplemented with survivors' self-reports during clinical assessments: (i) survivors of sexual assault involving physical force or coercion without substances ($n = 20$), and (ii) survivors of DFSA ($n = 19$), meaning the survivor reported being under the influence of substances (administered voluntarily or involuntarily) that limited their capacity to resist or recall

the event. Additionally, a control group of 39 adult women was recruited via community advertisements. The control group consisted of women with no history of SA or other traumatic events, matched on age, nationality, and education level to the survivors, serving as a reference for SF and psychological symptoms in a non-traumatized population. After applying the same exclusion criteria—along with the additional requirement that none had experienced sexual assault—35 cases were included. An ethics committee approved the study, and all participants provided informed consent. See Figure 1 for the sample recruitment flowchart.

Figure 1.
Sample Recruitment Flowchart



2.2. Materials

PTSD Symptom Severity and Clusters: The severity of PTSD symptoms was assessed in the survivor groups using the PTSD Scale Clinician-Administered for DSM-5 – Past Month Version (CAPS-5; Weathers et al., 2018), which evaluates 20 PTSD symptoms on a 5-point Likert scale ranging from 0 (no impairment) to 4 (extreme impairment). PTSD severity was calculated by summing the severity scores of individual items within each DSM-5 symptom cluster. The total CAPS-5 score ranges from 0 to 80, with higher scores indicating greater PTSD severity. Symptom clusters of PTSD were also assessed with the CAPS-5, according to the DSM-5: Criterion B (Reexperiencing) includes 5 items (range: 0–20), Criterion C (Avoidance) includes two items (range: 0–8), Criterion D (Negative alterations in cognitions and mood) includes 7 items (range: 0–28), and Criterion E (Hyperarousal) includes 5 items (range: 0–24); additionally, dissociation was assessed by summing two items. Criterion F requires that the disturbance has lasted at least one month and Criterion G requires that the disturbance cause either clinically significant distress or functional impairment. The CAPS-5 has demonstrated high internal consistency ($\alpha = 0.88$) and test-retest reliability ($\kappa = 0.83$) (Weathers et al., 2018).

Changes in Sexual Functioning: Both the survivor and control groups completed the Spanish version of the Changes in Sexual Functioning Questionnaire (CSFQ), a validated semi-structured interview designed to assess changes in sexual function in clinical populations following events such as medication use or stressors (Bobes, M. P. Gonzalez, F. Rico-Vill, 2000; Clayton et al., 1995). The questionnaire follows DSM-IV criteria for sexual dysfunction and consists of two subscales: one

measuring baseline sexual functioning and another assessing changes in sexual function after significant events.

The survivor group completed both subscales, whereas the control group only completed the baseline assessment, as the absence of any event affecting sexual function was expected to result in equivalent baseline and follow-up scores. The female version of the CSFQ (34 items) was exclusively administered, as it was the most appropriate for our all-female sample. The CSFQ evaluates five key dimensions of sexual functioning through 12 primary items. The five dimensions assessed are as follows: Sexual desire/frequency, Sexual desire/interest, Sexual pleasure, Arousal/excitement, and Orgasm/completion. The total score, which will serve as an index of general sexual satisfaction in this study, is obtained by summing the five scale scores plus two additional questions regarding loss of arousal and painful orgasm. Responses are recorded on a 5-point Likert scale, measuring frequency ("never" to "every day"), satisfaction ("none" to "great"), or change ("no change" to "greatly improved"). The instrument has demonstrated strong psychometric properties, with high internal consistency ($\alpha = 0.80$) and test-retest reliability ($\kappa = 0.85$) (Bobes, M. P. Gonzalez, F. Rico-Vill, 2000).

2.3. Procedure

All participants were individually assessed in a quiet room during a single 90-minute session, with all questionnaires administered by a clinician at the Foundation, where survivors had previously sought support. Assessments were conducted by trained clinicians who had not previously worked with the participants, ensuring that the evaluations were independent from any prior therapeutic relationship. As part of a broader study, all participants attended in-person appointments. The session began with

signing the informed consent form, followed by a semi-structured sociodemographic interview. Subsequently, participants completed the psychometric assessments.

2.4. Data analysis

Data were summarized using means and standard deviations for continuous variables and absolute and relative frequencies for categorical variables. Firstly, two MANOVAs were conducted to analyze the CAPS symptom subscales (i.e., reexperiencing, avoidance, negative cognitions and mood, hyperarousal, and distress) related to the number and severity of PTSD symptoms. We ran two MANOVAs because symptom count and symptom severity represent related but distinct constructs with different clinical interpretations. Two mixed ANOVAs were used to examine the number of symptoms and severity of overall PTSD, with Group (non-DFSA, DFSA) as the between-group variable. Chi-squared tests assessed differences in the presence of PTSD and dissociative symptomatology between groups. Secondly, mixed ANOVAs were performed for the CSFQ subscales, with Time of Assessment (Baseline, Follow-up) as the within-group variable and Group (non-DFSA, DFSA, control) as the between-group variable. Note that the control group was assessed only once, assuming no changes in SF due to the absence of a significant event. For the survivor group, SF change was calculated by subtracting the baseline score from the follow-up score. Thirdly, linear regression models were run for the change in each dimension of the SF, using the CAPS symptom subscales (reexperiencing, avoidance, negative cognitions and mood, hyperarousal, and distress) as potential predictors for SA survivors. All data, analysis, and research materials are available by emailing the corresponding author. All statistical analyses were conducted using Jamovi (version 2.6).

3. Results

Sociodemographic details are presented in Table 1. The sample consisted of 74 participants divided into three groups: survivors of non-DFSA (N = 20), survivors of DFSA (N = 19), and a control group (N = 35). The groups were comparable in sex, age, educational level, and nationality (all $ps > .069$). Participants ranged in age from 18 to 46 years ($M = 26.3$, $SD = 7.06$). Among the DFSA group, 31.6% reported voluntary substance intake, 15.8% involuntary intake, and 53.6% a mixed intake; most reported mixed ingestion (e.g., alcohol and other substances). Memory impairment also varied significantly ($p = .037$), with the DFSA group showing a higher proportion of survivors with no or partial memories. Conversely, the survivor groups were comparable in terms of the type of assault, time since the assault, and relationship with the aggressor (all $ps > .13$).

Table 1.

Sociodemographic details for non-DFSA survivors, DFSA survivors and control group

	Non-DFSA(n= 20)	DFSA(n= 19)	Control (n= 35)	p
Females (n)	20	19	35	
Age	25.3 (7.29)	30.2 (8.81)	24.8 (5.17)	.069
Education (n)				.172
Primary studies	3	1	0	
Secondary studies	6	5	14	
University Studies	11	13	21	
Nationality (n)				.087
European	15(75%)	12(63.2%)	31(88.6%)	
Latin American	5(25%)	7(6.8%)	4(11.4%)	
Sexual Orientation (n)				.778
Heterosexual	16(80%)	15(78.9%)	30(85.7%)	
Homosexual	0	0	0	

Bisexual	4(20%)	4(21%)	5(14.3%)	
Religion (n)				.404
Believer	9(45%)	10(52.6%)	12(34.3%)	
Non-believer	11(55%)	9(47.4%)	23(65%)	
Marital Status (n)				.523
With a partner	8(40%)	7(36.8%)	18(51.4%)	
Without a partner	12(60%)	12(63.2%)	17(48.6%)	
Type of Sexual Assault (n)				.2
With penetration	8(40%)	15(78.9%)		
Without penetration	12(60%)	4(21.1%)		
Time since de assault	10.10(7.23)	8.58(5.75)		.475
Injuries after Sexual Assault (n)				.345
Severe (fractures, vaginal/anal tears)	4(20%)	2(10.5%)		
Mild (contusions)	9(45%)	6(31.6%)		
No injures	7(35%)	11(57.9%)		
Type of intake (n)				<.001
Voluntary intake	0	6(31.6%)		
Involuntary intake	0	3(15.8%)		
Mixed intake	0	10(53.6%)		
No intake	20(100%)	0		
Substance Ingested				
Alcohol		7(36.8%)		<.001
Other substances (drugs or medication)		3(15.8%)		
Mixed substances		9(47.4%)		
Report (n)	16(80%)	15(78.9%)		.935
Pregnancy (n)	0	0		
Memory of the assault				.037
No memories	3(15%)	8(42.1%)		
Partial memories	5(25%)	7(36.8%)		
Full memory	12(60%)	4(21.1%)		

Number of therapy sessions	4.4 (4.45)	2.36 (5.49)	.00
Number of perpetrators	1 (0.00)	1.15 (0.37)	.00
Age of aggressors	32.35 (13.56)	28.84 (14.69)	.00
Nationality of perpetrators (n)			.15
Same as the survivor	14(70%)	6(31.6%)	
Different from the survivor	6(30%)	13(68.4%)	
Male perpetrators (n)	20 (100%)	19(100%)	
Relationship with the perpetrator (n)			.13
Stranger	4(20%)	5(26.3%)	
Recent acquaintance	7(35%)	11(57.9%)	
Intimate relationship	9(45%)	3(15.8%)	
Scenario of the assault (n)			.33
Private	13(65%)	15(78.9%)	
Public	7(35%)	4(21.1%)	
Percived psychological consequences (n)	16(80%)	16(84.2%)	.73
Sexually transmitted infections (n)	5(25%)	3(15.8%)	.47

DFSA = drug-facilitated sexual assault; SA = sexual assault

Note. Data are presented as frequency (N) or means (M), with standard deviations (SD) shown in parentheses.

3.1. Number and Severity of each PTSD symptom cluster

Table 2 presents the number and severity of each PTSD symptom cluster in each survivor group.

Table 2.

CAPS-5 scale results for non-DFSA and DFSA survivors

	Non-DFSA (M, SD)	DFSA (M, SD)
Number of Symptoms		
Reexperiencing	4.10 (0.85)	3.05 (1.58)
Avoidance	1.70 (0.47)	1.47 (0.70)
Negative cognition and mood	4.35 (1.84)	3.79 (1.58)
Hyperarousal	3.50 (1.70)	3.10 (1.94)
Distress	2.60 (0.68)	1.89 (1.24)
Dissociative	0.60 (0.75)	0.00 (0.00)
Severity		
Reexperiencing	12.65 (3.30)	8.84 (4.39)
Avoidance	5.20 (1.36)	4.21 (1.51)
Negative cognition and mood	13.70 (6.04)	11.31 (4.57)
Hyperarousal	11.75 (5.63)	9.52 (5.71)
Distress	7.55 (2.48)	5.26 (2.60)
Dissociative	1.70 (2.10)	0.05 (0.23)
Total Number of Symptoms	13.65 (3.53)	11.42 (4.42)
Total Severity	43.30 (13.21)	33.89 (12.72)

DFSA = drug-facilitated sexual assault; PTSD = Post-traumatic stress disorder; CAPS-5: Clinician-Administered PTSD Scale for DSM-5

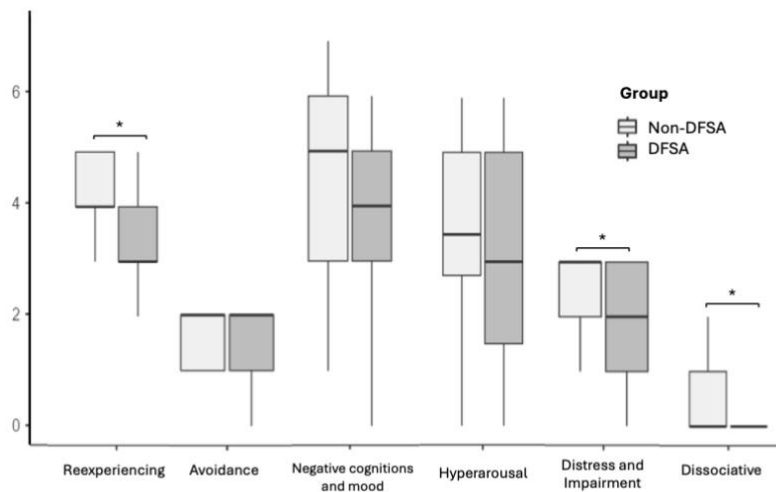
Note. Data are presented as means (M), with standard deviations (SD) shown in parentheses.

The MANOVA for PTSD symptom count showed a significant group effect ($F(6, 32) = 3.75, p = .006$; Pillai's trace = .413). Reexperiencing symptoms ($F(1, 37) = 6.73, p = .013$), distress or impairment ($F(1, 37) = 4.90, p = .033$), and dissociation ($F(1,$

37) = 12.017, $p = .001$) were more pronounced in the non-DFSA group. No significant group differences were observed for arousal and reactivity ($F(1, 37) = 0.46$, $p = .503$), avoidance behaviors ($F(1, 37) = 1.42$, $p = .240$), or mood disturbances ($F(1, 37) = 1.03$, $p = .316$). See Figure 2 for the number of PTSD symptom cluster comparisons across groups.

Figure 2.

Box plot displaying the distribution of PTSD symptom number (CAPS-5) for non-DFSA and DFSA survivor groups



Note: Boxes represent mean values; error bars indicate the standard error of the mean.

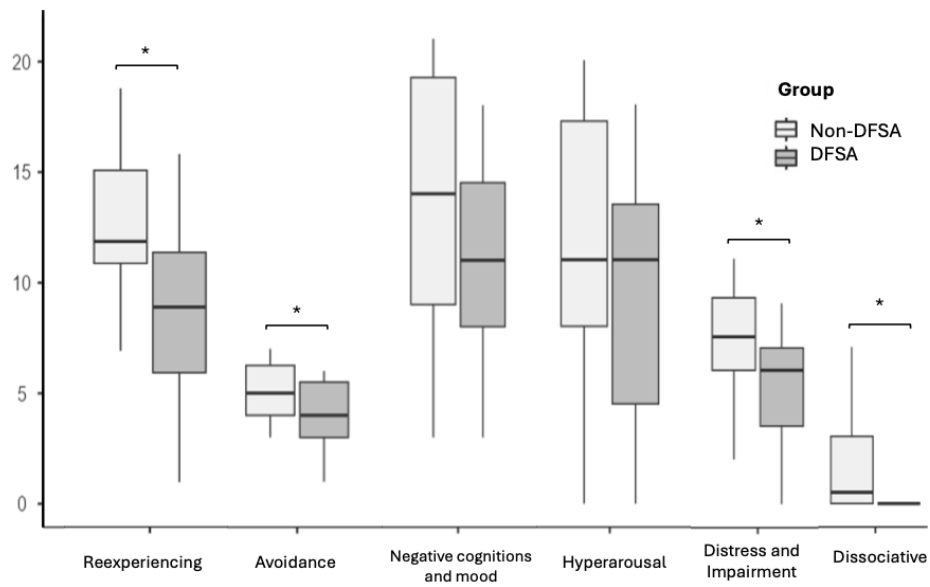
Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

The MANOVA for PTSD symptom severity also showed a significant group effect ($F(6, 32) = 3.31$, $p = .012$; Pillai's trace = .383). The non-DFSA group exhibited higher severity in reexperiencing ($F(1, 37) = 9.45$, $p = .004$), avoidance behaviors ($F(1, 37) = 4.62$, $p = .038$), distress or impairment ($F(1, 37) = 7.90$, $p = .008$), and dissociation ($F(1, 37) = 11.49$, $p = .002$). No group differences were found for arousal

and reactivity ($F(1, 37) = 1.50, p = .228$) or mood disturbances ($F(1, 37) = 1.91, p = .175$). See Figure 3 for the severity of PTSD symptom cluster comparisons across groups.

Figure 3.

Box plot displaying the distribution of PTSD symptom severity scores (CAPS-5) for non-DFSA and DFSA survivor groups



Note: Boxes represent mean values; error bars indicate the standard error of the mean.

Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

3.2. Presence of PTSD

To assess the proportion of participants meeting PTSD criteria, descriptive data showed that 14 non-DFSA survivors and nine DFSA survivors met PTSD criteria.

However, the chi-square test revealed no significant differences between groups, $\chi^2(1) = 2.06, p = .151$.

3.4. Changes in SF after SA

Table 3 displays comparisons of baseline and follow-up levels of each CSFQ domain for each survivor group.

Table 3.

CSFQ scale results at the baseline and follow-up level for non-DFSA and DFSA survivors

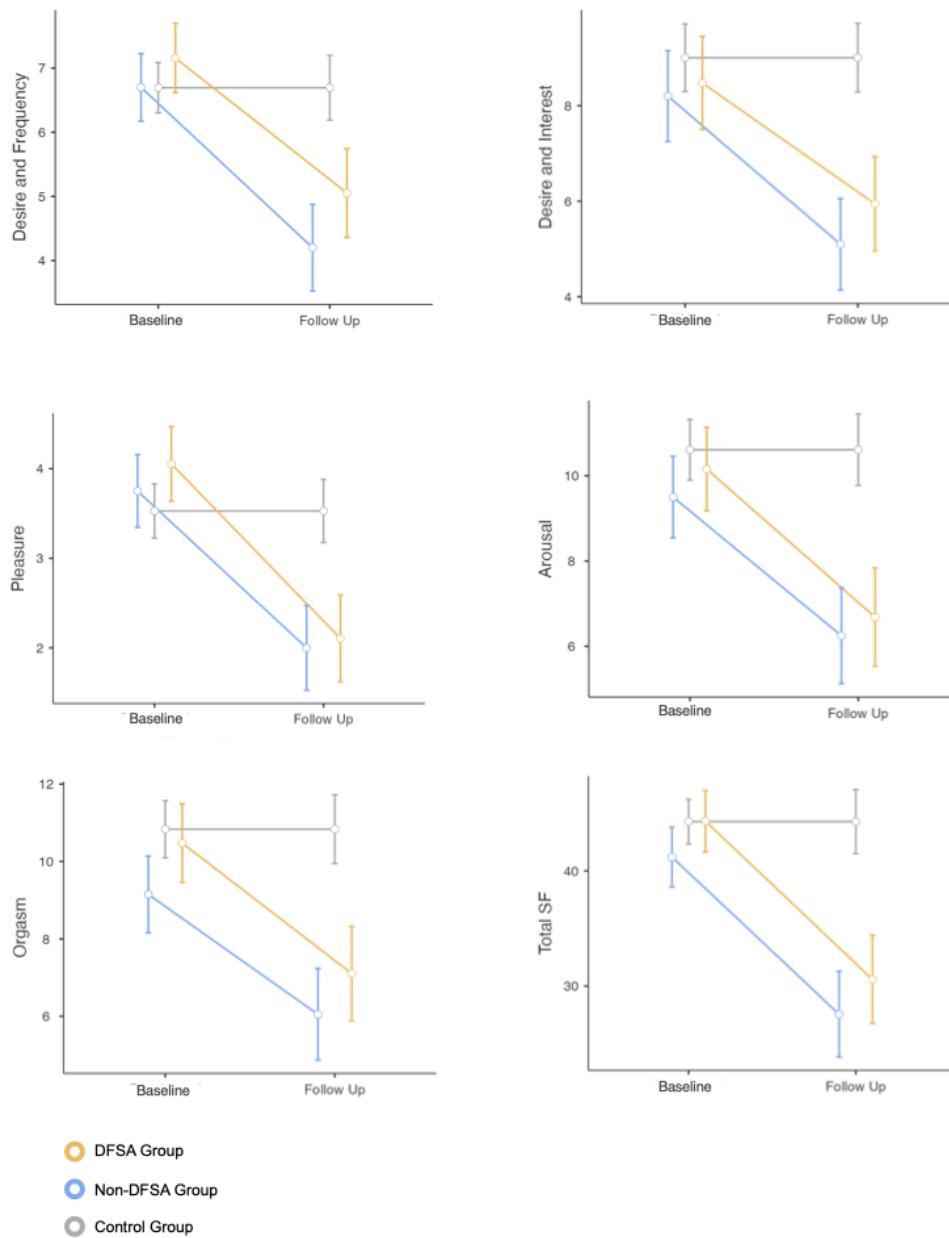
	Time of Assesment	Non-DFSA	DFSA	Control
Desire and Frequency	Baseline	6.70 (1.41)	7.16 (1.3)	6.69 (0.95)
	Follow-Up	4.20 (1.70)	5.05 (2.09)	6.69 (0.95)
Desire and Interest	Baseline	8.20 (2.19)	8.47 (2.29)	9.00 (1.98)
	Follow-Up	5.10 (2.22)	5.95 (2.39)	9.00 (1.98)
Pleasure	Baseline	3.75 (0.91)	4.05 (0.62)	3.53 (1.02)
	Follow-Up	2.00 (1.02)	2.11 (1.15)	3.53 (1.02)
Arousal	Baseline	9.50 (2.68)	10.16 (2.26)	10.61 (1.69)
	Follow-Up	6.25 (3.05)	6.68 (3.16)	10.61 (1.69)
Orgasm	Baseline	9.15 (2.73)	10.47 (2.45)	10.83 (1.71)
	Follow-Up	6.05 (3.15)	7.11 (3.49)	10.83 (1.71)
Total SF	Baseline	41.20 (7.38)	44.32 (6.22)	44.28 (4.48)
	Follow-Up	27.55 (10.60)	30.58 (11.09)	44.28 (4.48)

DFSA = drug-facilitated sexual assault; CSFQ = Changes in Sexual Functioning Questionnaire

Note. Data are presented as means (M), with standard deviations (SD) shown in parentheses.

See Figure 4 for CSFQ scores at baseline and follow-up across groups for each subcale.

Figure 4. *Graphs showing the results in each domain of sexual functioning on the CSFQ scale for the non-DFSA group, the DFSA group, and the control group.*



3.5. Desire and Frequency

A mixed ANOVA revealed significant effects for Group ($F(2,72) = 7.88, p < .001; \eta^2 = .092$) and Time of Assessment ($F(1,72) = 71.9, p < .001; \eta^2 = .5$), along with a significant interaction ($F(2,72) = 22.4, p < .001; \eta^2 = .383$).

Post-hoc analysis showed no baseline differences between groups (all $ps = 1.00$). However, within-group comparisons indicated significant reductions in desire and frequency for both non-DFSA ($t(72) = 7.435, p < .001$) and DFSA ($t(72) = 6.102, p < .001$) survivors.

3.6. Desire and Interest

Both main effects for Time of Assessment ($F(1,72) = 61.0, p < .001; \eta^2 = .119$) and Group ($F(2,72) = 11.7, p < .001; \eta^2 = .245$) were significant, as was the interaction effect ($F(2,72) = 19.1, p < .001; \eta^2 = .347$).

Post-hoc analysis showed no baseline differences between groups (all $ps = 1.00$). However, within-group comparisons indicated significant reductions in desire and interest for non-DFSA ($t(72) = 6.949, p < .001$) and DFSA ($t(72) = 5.520, p < .001$) survivors.

3.7. Pleasure

Main effects for Time of Assessment ($F(1,72) = 143.2, p < .001, \eta^2 = .135$) and Group ($F(2,72) = 3.87, p = .025, \eta^2 = .269$) were significant. Additionally, a significant interaction effect was observed ($F(2,72) = 43.8, p < .001, \eta^2 = .135$).

Post-hoc intergroup comparisons at baseline indicated no significant differences between the three subgroups (all $ps > .69$). Regarding within-group changes over time,

post-hoc analyses revealed significant declines in Pleasure scores for both the non-DFSA group ($t(72) = 9.148, p < .001$) and the DFSA group ($t(72) = 9.922, p < .001$).

3.8. Arousal

Both main effects for Time of Assessment ($F(1,72) = 62.3, p < .001, \eta^2 = .133$) and Group ($F(2,72) = 14.3, p < .001, \eta^2 = .180$) were found, and as was the interaction effect ($F(2,72) = 19.0, p < .001, \eta^2 = .081$).

Post-hoc intergroup comparisons at baseline showed no significant differences between the three subgroups (all $ps = 1.00$). For within-group comparisons, significant declines in Arousal scores were observed for both the non-DFSA group ($t(72) = 6.163, p < .001$) and the DFSA group ($t(72) = 6.420, p < .001$).

3.9. Orgasm

Significant main effects for Time of Assessment ($F(1,72) = 48.3, p < .001, \eta^2 = .113$) and Group ($F(2,68) = 16.7, p < .001, \eta^2 = .206$), with a significant interaction effect ($F(2,72) = 14.8, p < .001, \eta^2 = .069$) was found.

Post-hoc intergroup comparisons at baseline indicated no significant differences among the three subgroups (all $ps > .12$). For within-group comparisons, substantial declines in Orgasm scores were found for both the non-DFSA group ($t(72) = 5.379, p < .001$) and the DFSA group ($t(72) = 5.697, p < .001$).

3.10. PTSD risk factors of SF difficulties in SA survivors

A significant regression model was found for Desire and Frequency decline, $F(1, 38) = 6.34, p = .016, R^2 = .15, R^2_{\text{Adjusted}} = .12$. The analysis indicated that Desire and Frequency deterioration was predicted by: $+ .48 + .15$ mood disturbances severity. Similarly, a significant regression model was found for Desire and Interest decline, $F(1,$

38) = 9.08, $p = .005$, $R^2 = .20$, $R^2_{\text{Adjusted}} = .18$. Desire and Interest deterioration was predicted by: + .53 + .22 reactivity severity. For Pleasure decline, a significant regression equation was found, $F(2, 38) = 5.09$, $p = .011$, $R^2 = .22$, $R^2_{\text{Adjusted}} = .18$. Pleasure deterioration was predicted by: + 1.20, + .27 mood disturbances severity, - .68 mood disturbances symptom count. Regarding Orgasm decline, a significant regression equation was identified, $F(2, 38) = 9.78$, $p < .001$, $R^2 = .35$, $R^2_{\text{Adjusted}} = .328$. Orgasm deterioration was predicted by: + .10, + .91 reactivity severity, and - 1.98 reactivity symptoms count. Conversely, no significant regression model was found for Arousal decline.

4. Discussion

The present study aimed to investigate the posttraumatic and sexual consequences of SA in DFSA and non-DFSA survivors. Although both groups met PTSD criteria at comparable rates, differences emerged when analyzing PTSD symptom clusters. DFSA survivors exhibited significantly lower severity in reexperiencing, distress, avoidance, and dissociative symptoms. Additionally, they presented fewer symptoms within the reexperiencing, distress, and dissociation clusters. Regarding SF, both groups experienced a significant decline across all domains, including sexual desire (frequency and intensity), pleasure, arousal, and orgasm, irrespective of DF. Furthermore, PTSD symptoms—particularly cognitive and mood disturbances and hyperarousal severity—were identified as key predictors of SF deterioration across all domains except arousal. These results underscore the complex interplay between PTSD symptomatology and SF impairment in SA survivors. The following sections will further examine each outcome, offering a nuanced discussion.

Regarding PTSD, similar to prior research (Kilpatrick et al., 2007; Littleton et al., 2009; Fields et al. 2022), both DFSA and non-DFSA survivors met PTSD criteria at

comparable rates. This may be due to the assessment of overall PTSD severity rather than specific symptom clusters, which could mask differences between groups. Indeed, our findings are aligned with those that suggest DF may have a protective effect for specific PTSD clusters, although differences in PTSD symptom expression were reported (Fields et al., 2022). Notably, the similarities in our findings can be due to Fields et al. (2022) examined a clinical sample with a mean age similar to ours, consisting of individuals receiving professional care. However, while they reported lower dissociative symptoms among DFSA survivors, we additionally found differences in reexperiencing, distress, and avoidance. These differences may be explained by the fact that, although Fields et al. (2022) documented childhood, prior adult SA, and premorbid substance use disorder, participants with pre-existing mental health conditions were not excluded. Certainly, incongruences in literature likely stem from methodological differences across studies in sample characteristics and the extent to which confounding variables were controlled. McConnell et al. (2017), Jaffe et al. (2017), Zinzow et al. (2010), and Peter-Hagene and Ullman (2018) relied on community samples, where individuals with heterogeneous trauma histories and varying levels of support may exhibit different symptom patterns. This distinction is crucial, as clinical populations may present more severe and persistent symptoms, influencing the way PTSD manifests. Additionally, age differences may have contributed to variability in findings, with samples ranging from 18–25 years (Jaffe et al., 2017; McConnell et al., 2020) and beyond 70 years (Zinzow et al., 2010; Peter-Hagene and Ullman, 2018). Moreover, individual risk factors were not consistently addressed across studies. For example, McConnell et al. (2017) did not account for trauma history, as well as Peter-Hagene and Ullman (2018) who neither controlled mental health conditions, Zinzow et al. (2010) allowed participants to be classified into multiple groups if they had

experienced both DFSA and non-DFSA. Finally, although Jaffe et al. (2017) controlled for prior SA and time elapsed since the assault, they did not account for other traumatic experiences or pre-existing mental health conditions, limiting the interpretation of their results. By contrast, our study is the only one in which confounding variables, such as prior trauma, sexual revictimization, childhood SA, and pre-existing mental health conditions, were controlled, allowing us to isolate the specific impact of a recent SA on PTSD outcomes.

Regarding the SF after SA and following our hypothesis, our findings reinforce the well-established link between SA and SF difficulties (Van Berlo & Ensink, 2000) as survivors reported significant declines in sexual desire (frequency and intensity), pleasure, arousal, and orgasm compared, even in DFSA cases. This aligns with prior research indicating that SA survivors experience impairment in all areas of SF compared to individuals without a history of SA (Kelley & Gidycz, 2019; Turchik & Hassija, 2014). Our findings add to the literature that these SF difficulties occur even in DFSA cases. Nevertheless, although SF impairment is common among non-DFSA and DFSA cases, the cognitive and emotional underlying mechanisms may differ among them. DFSA survivors may experience post-assault SF difficulties due to confusion and uncertainty about the event, a perceived loss of control over their body and sexuality, and feelings of vulnerability resulting from impaired perceptual awareness. Additionally, attributions of personal responsibility or heightened self-blame for drinking to the point of impairment or incapacitation (Littleton et al., 2009; Macy et al., 2006; Peter-Hagene & Ullman, 2018; Testa et al., 2003; Tihihonen Möller et al., 2014) may underlie these difficulties. In contrast, in non-DFSA, these difficulties may be more influenced by the association of sexual activity with danger or coercion or feelings of guilt that can develop into self-recrimination when experiencing arousal or sexual

excitation (Davis & Petretic-Jackson, 2000). Future research should explore which of these cognitive distortions and emotional symptoms mediate this association, providing further insight into the mechanisms underlying SF impairment in DFSA survivors.

Finally, unlike previous research that assessed PTSD categorically (Högbeck & Möller, 2022), our study underscores the importance of analyzing PTSD symptom clusters separately, as they can differentially impact SF. Consistent with prior research highlighting PTSD as a key mediator in the relationship between SA and SF difficulties (Letourneau et al., 1996; O’Driscoll & Flanagan, 2016), our results indicate that negative cognitions and mood, as well as hyperarousal symptoms, predicted SF deterioration in all SA survivors –note that these PTSD symptoms were comparable across our groups. Similarly, Schnurr et al. (2009) found that hyperarousal symptoms are mainly linked to reduced sexual satisfaction in a female veterans sample; however, the participants may have had a large variety of trauma histories and also presented multiple mental health comorbidities. Nevertheless, our results reveal that, even after controlling these factors, not only hyperarousal but also negative cognitions and mood were associated with SF deterioration. This may be because hyperarousal symptoms can interfere with focusing on pleasure and increase fear and threat perception, exacerbating pain during sex and reducing both desire and satisfaction. Additionally, negative cognitions and mood following SA may interfere with sexual pleasure and satisfaction (O’Driscoll and Flanagan, 2016). Further assessment of the arousal baseline level, as well as cognitive and mood symptoms underlying this association, could expand our understanding of the issue and provide valuable insights for clinical interventions.

Despite the relevance of the findings obtained in this study, several limitations should be considered. The small sample size, resulting from the strict exclusion criteria, may have affected the statistical power and the generalizability of the results,

considering that many SA survivors have a history of revictimization. However, precisely by applying these rigorous criteria, we obtained a highly specific sample, allowing us to isolate the impact of a recent SA without the influence of childhood SA, prior SA, or other traumatic events, thereby strengthening the study's internal validity. Another limitation is that SF measures were based on self-reports, which may be affected by memory biases or social desirability effects. However, we used a standardized and objective measure, ensuring that all participants provided comparable data across different groups. Furthermore, given the sensitive nature of sexual difficulties, self-reports remain one of the most widely used methods in research on SF, as they allow participants to express their experiences in a more personal and less intrusive manner than structured clinical interviews. Despite these limitations, the findings of this study provide new insights into the impact of DFSA on PTSD and SF with a novel design, which includes DFSA survivors as a distinct group, allowing for a direct examination of the effects of substance use on a recent and isolated SA while eliminating confounding factors such as other traumas or pre-existing mental disorders.

To sum up, this study emphasizes the need to better understand PTSD consequences and the psychological mechanisms involved in post-assault SF difficulties when a DFSA has occurred. Regarding clinical implications, psychological treatments for PTSD should be tailored to each group, given the differences found in PTSD symptom presentation (DFSA survivors exhibited lower severity and number of symptoms within reexperiencing, distress, and dissociation clusters, and lower severity of avoidance symptoms than non-DFSA ones). However, it is equally important not to overlook the PTSD symptoms shared by both groups, such as cognitive and mood disturbances and hyperarousal, which have been identified as key predictors of SF deterioration, highlighting their relevance in post-assault therapeutic approaches.

Addressing these common symptoms may be essential for mitigating long-term sexual difficulties in all survivors, regardless of the assault type. Additionally, further research is needed to delve deeper into the underlying mechanisms driving this association, exploring specifically the content of cognitive distortions and emotional symptoms as well as the role of hyperarousal symptoms, as our results suggest that these factors play a crucial role in post-assault sexual impairment. For instance, differences in the content of trauma-related cognitions, such as self-blame or fear-based schemas, and the nature of negative emotional responses, including shame, guilt, or helplessness, could contribute differently to post-assault SF impairments. A deeper understanding of these mechanisms would help refine treatment strategies, allowing for more targeted and effective clinical interventions that consider the unique psychological challenges faced by each group.

Thus, future research should further investigate how PTSD symptomatology interacts with different SA profiles to refine interventions tailored to the specific needs of DFSA and non-DFSA survivors. In this sense, future studies should consider exploring the content of cognitive distortions and emotional symptoms, as our results suggest that these factors play a crucial role in post-assault sexual impairment. In conclusion, these findings may have important implications for therapeutic approaches, as they highlight the need to tailor interventions to the specific PTSD symptom profiles that manifest differently depending on the experience of a DFSA or a non-DFSA.

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Annexe 4. Emotion-Related Attentional Biases in Survivors of Drug-Facilitated and Non-Drug-Facilitated Sexual Assault: A Four-Alternative Free-Viewing Eye-Tracking Study

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**Emotion-Related Attentional Biases in Survivors of Drug-Facilitated and Non-
Drug-Facilitated Sexual Assault:
A Four-Alternative Free-Viewing Eye-Tracking Study**

Marta Lizarán^{a,b} (marta_lizaran@iislafe.es)
ORCID: 0000-0003-1319-6922

Adrián Torres-Villasante^c (adrian.torres@iispv.cat)
ORCID: 0009-0002-5400-6996

Julia Andreu Martínez^d (andreu_julia@gva.es)
ORCID: 0000-0001-7535-4485

Nadina Gómez-Merino^e (nadina.gomez@uv.es)
ORCID: 0000-0001-9234-406X

Alba Moreno-Giménez^{a,b} (alba_moreno@iislafe.es)
ORCID: 0000-0003-4483-6101

Belén Almansa^{a,b} (belen_almansa@iislafe.es)
ORCID: 0009-0004-1699-0368

Ana García-Blanco^{a,d} (ana.garcia-blanco@uv.es)
ORCID: 0000-0002-7840-000X

AUTHOR RESPONSIBLE FOR CORRESPONDENCE:
Ana García-Blanco^{a,d} (ana.garcia-blanco@uv.es) / +34 961244000
ORCID: 0000-0002-7840-000X

AFFILIATIONS

a Mental Health Research Group, Health Research Institute La Fe, Avenida Fernando Abril Martorell 106, Valencia 46026, Spain

b Department of Personality, Evaluation and Psychological Treatment, Faculty of Psychology, University of Valencia, Av. Blasco Ibáñez, 21, 46010, Valencia, Spain

c Pere Virgili Health Research Institute, University Hospital of Tarragona Juan XXIII, Carrer Dr. Mallafré Guasch, 4, 43007 Tarragona, Spain

d Department of Psychiatry and Clinical Psychology, La Fe University and Polytechnic Hospital, Avenida Fernando Abril Martorell 106, Valencia 46026, Spain

e ERI-Lectura, Faculty of Psychology, University of Valencia, Av. Blasco Ibáñez, 21, 46010, Valencia, Spain

Abstract

Drug-Facilitated Sexual Assault (DFSA) presents distinct psychological features as confusion, memory impairment, and fragmented trauma narratives, which may uniquely impact trauma processing. Nevertheless, DFSA survivors remain underrepresented in clinical research. This study explores how they process emotionally salient information to illuminate trauma-related emotional and cognitive adaptations. During 2023 and 2024, a clinical sample of 39 women who had recently experienced an isolated sexual assault (19 DFSA, 20 non-DFSA), and 35 socio-demographically matched non-exposed controls, completed an eye-tracking free-viewing task. Participants were simultaneously presented with scenes depicting threatening, sad, happy, and neutral emotions for 20 seconds. While stimulus valence influenced early attentional responses, clinical status modulated patterns during later stages. Emotional stimuli elicited faster latencies and longer first-pass fixations compared to neutral scenes, with happy images showing the highest probability of capturing initial fixation. In sustained attention, unlike non-DFSA, DFSA survivors displayed greater attention toward threatening stimuli and reduced attention to happy images. Specific PTSD symptoms also shaped attentional dynamics: higher avoidance severity was associated with decreased attention to threat and increased focus on positive stimuli, whereas dissociative symptoms correlated with heightened attention to neutral scenes and diminished fixations on threat. Notably, these symptoms were more prevalent in the non-DFSA group. Findings underscore the role of trauma type and symptom profile in shaping attentional patterns, which may become maladaptive over time, reinforcing a threatening worldview in DFSA survivors or emotional disconnection in non-DFSA survivors. Tailored interventions should consider these distinct attentional and clinical profiles to enhance more targeted trauma treatment.

Key words: Attentional Bias; Drug-Facilitated Sexual Assault; Emotional Processing; Eye-Tracking; PTSD

1. Introduction

Drug-facilitated sexual assault (DFSA) represents a complex form of sexual violence, characterized by the victim's incapacitation through substances, leading to a profound loss of control, significant disruption in perceptual awareness, feelings of bodily disconnection, uncertainty about what occurred, and often a fragmented or biased recollection of the event (Fields et al., 2022; Gauntlett-Gilbert et al., 2004; Saint-Martin et al., 2006). These unique characteristics of DFSA make it especially challenging to grasp its psychological impact fully; hence, survivors may manifest different patterns of posttraumatic stress disorder (PTSD) symptoms due to the way they process and make sense of the traumatic experience. The absence of coherent trauma narratives challenges both diagnosis and treatment, and underscores the need for alternative approaches to assess post-assault impact. A promising strategy in this context is the study of attentional biases toward emotional information, a mechanism believed to play a central role in emotion regulation and psychological functioning (Klanecky Earl et al., 2020; Latack et al., 2017). Investigating attentional allocation to emotional stimuli, particularly within ecologically valid paradigms that simulate real-life complexity, may offer valuable insights into the nuanced cognitive-affective alterations associated with DFSA. This study examines attentional differences between DFSA and non-DFSA survivors using an eye-tracking task with simultaneously presented multiple emotional scenes together with a neutral one.

Eye-tracking methodologies constitute one of the most ecologically valid approaches to studying attentional biases (Skinner et al., 2018). Such paradigms allow for the direct, continuous observation of visual attention and can disentangle distinct attentional processes, including initial orienting (i.e., initial fixation latency and initial

fixation probability), engagement (i.e., first-pass duration), and sustained attention (i.e., percentage of total duration and percentage of total fixation) (Armstrong et al., 2013). This is particularly valuable when examining how individuals navigate emotionally meaningful social contexts—an area of great relevance in the assessment and treatment of interpersonal trauma survivors. Despite their promise, no studies to date have applied this approach to SA survivors, nor specifically to individuals who suffered a DFSA. The closest available evidence comes from research with survivors of intimate partner violence (IPV), who may or may not have experienced SA in this context. Lee and Lee (2012, 2014) examine attentional patterns in women with histories of intimate partner violence, differentiating those with and without PTSD, through different eye-tracking free-viewing tasks. In one of them, four emotional scenes were simultaneously presented (trauma-related violence, dysphoria, happiness, and neutral) for 10 seconds (Lee & Lee, 2012). While no differences appeared during earlier stages, survivors with PTSD symptoms showed greater sustained attention (i.e., total fixation duration) to trauma-related images than those without PTSD or controls. Across all survivors, attention was also biased toward dysphoric stimuli and away from happy scenes, compared to the control group. The latter study simplified the task by presenting pairs of emotional faces (e.g., angry vs. neutral, fearful vs. happy) to focus on early orienting processes (Lee & Lee, 2014). However, no group differences were found at this stage. Conversely, a gradient in sustained attention emerged, with PTSD participants showing the greatest fixations on angry faces, followed by those without PTSD, and then controls. Both survivor groups also showed increased fixations on fearful faces compared to the control group. Notably, while both studies provide valuable insights, the design used by Lee and Lee (2012) offers greater ecological validity. By presenting multiple emotionally charged scenes simultaneously, this type of task better reflects the

complexity of real-world situations in which individuals must process and prioritize competing emotional information. Applying this ecologically valid approach to SA survivors—especially those affected by DFSA—could yield a more nuanced and clinically meaningful understanding of attentional patterns in this population, whose responses may be shaped by the ambiguous and multifaceted nature of their trauma experiences. Importantly, most existing research on SA survivors has relied on well-established response-time paradigms. Although these methods are less suited to capturing the temporal dynamics of attentional processing (Lazarov et al., 2019), they have made substantial contributions to the field by revealing consistent patterns of cognitive interference and attentional bias toward emotional information.

One of the most commonly used tasks is the emotional Stroop paradigm, which assesses cognitive interference through delayed color naming of emotionally salient words compared to neutral ones (Williams et al., 1996). Numerous studies have applied this task to diverse SA populations, including survivors of childhood assault (Bremner et al., 2004; McNally et al., 2000), adulthood assault (Cassiday et al., 1992; Fleurkens et al., 2011; Foa et al., 1991), revictimized individuals (Field et al., 2001; Patriquin et al., 2012), and samples without specification of the timing of the abuse (Martinson et al., 2013). These studies often compare SA survivors with and without PTSD, though findings remain inconclusive: some report heightened interference for trauma-related words in those with PTSD (Cassiday et al., 1992; Foa et al., 1991), while others do not observe significant group differences (Bremner et al., 2004; Martinson et al., 2013). Similarly, comparisons between SA survivors without PTSD and non-traumatized controls yield inconsistent results: while some research finds increased interference in survivors (Cassiday et al., 1992), others report no attentional differences (Foa et al., 1991; Martinson et al., 2013; Patriquin et al., 2012). In an attempt to clarify these

inconsistencies, Latack et al. (2017) conducted a meta-analysis revealing that SA survivors—especially those with PTSD—exhibit a significant attentional bias toward trauma-related stimuli, emphasizing the influence of PTSD symptomatology on cognitive processing. McNally et al. (2000) further refined this association by examining adult survivors of childhood SA, comparing individuals with repressed, recovered, and continuous trauma memories to non-victimized controls. Stronger interference emerged among those with recovered or continuous memories, although PTSD symptom severity remained the most robust predictor of attentional bias. These findings underscore the importance of trauma-related symptomatology but leave open important questions, particularly regarding SA survivors who lack a clear or coherent trauma narrative, as is often the case in DFSA.

While the emotional Stroop task has provided valuable insights, it does not allow for the dissociation of specific attentional processes, such as orienting versus disengagement. In response to this limitation, paradigms such as the dot-probe task were developed to capture early attentional orienting by briefly presenting emotionally salient and neutral stimuli side by side, followed by a probe appearing in one of the previous locations (MacLeod et al., 1986). Faster responses to probes replacing emotional stimuli are interpreted as evidence of preferential attentional allocation. Using this method, (Hirai et al. (2022) assessed women from the general population, comparing three groups: (i) survivors of childhood SA (with or without later revictimization), (ii) survivors of adulthood SA, and (iii) non-traumatized controls. Both SA groups showed greater attentional bias toward threat-related words compared to controls, although no differences were observed between the SA subgroups. However, the combination of childhood and revictimized participants into a single group may have obscured effects related to trauma timing or cumulative exposure. Moreover, the

retrospective nature of trauma reporting complicates generalizability to survivors of recent assaults. Finally, because reaction-time tasks are inherently influenced by decision-making and motor execution processes (Lazarov et al., 2019), it remains difficult to determine whether observed delays genuinely reflect attentional bias or broader cognitive or motor slowing. Focusing on individuals who have recently experienced a single adult SA, and using a task capable of capturing the temporal dynamics of attention within emotionally complex contexts, may yield more precise insights into trauma-related attentional mechanisms.

This study examines attentional biases in a clinical sample of individuals who experienced DFSA compared to those who experienced non-DFSA, using a free-viewing eye-tracking task designed to enhance ecological validity by presenting multiple emotionally salient images (happy, neutral, sad, and threatening) simultaneously. To isolate the impact of trauma type, participants were selected based on having exclusively experienced a single incident of SA within the previous year. To assess different stages of attentional processing, initial orienting, engagement, and sustained attention were assessed. PTSD symptom severity was also examined to explore how different symptom clusters are associated with attentional bias patterns. Based on existing literature, we formulated three hypotheses: (i) informed by research on attentional bias and memory disruption (McNally et al., 2000), we hypothesize that DFSA survivors will exhibit reduced attentional bias toward threat-related stimuli in comparison to non-DFSA survivors, showing patterns more similar to those of control participants; (ii) consistent with Lee and Lee (2012, 2014), we anticipate no group differences during early orienting stages, but expect SA survivors, as a whole, to display greater sustained attention toward threatening and sad stimuli, and away from happy scenes; and (iii) expanding on prior PTSD findings (see Lazarov et al., 2019 for a

systematic review), we predict that higher PTSD symptom severity (e.g., avoidance or hypervigilance) will be associated with increased attentional bias to threat among SA survivors.

2. Method

2.1. Participants

Case records from 400 patients from a foundation specializing in services for SA survivors were reviewed. From these, 133 cases were selected based on the criterion that the assault had occurred within the past year, ensuring recent trauma exposure. A priori sample size was determined using G*Power (version 3.1), based on a medium effect size ($f = 0.25$), an alpha level of .05, and a power of .80 for a repeated-measures ANOVA with three groups and four conditions. The minimum required sample size was estimated at 66 participants. Our final sample exceeded this threshold. Seventy-four women participated in the study. Thirty-nine survivors of a recent, isolated SA were recruited and divided into two groups: (1) survivors of non-DFSA, meaning assaults involving physical force or coercion without the use of substances ($n = 20$), and (2) survivors of DFSA ($n = 19$). A non-exposed control group ($n = 35$), matched on age, gender, education, and nationality, was recruited through community advertisements. Strict exclusion criteria were applied to ensure clinical comparability across groups and reduce potential confounds, which, along with the difficulty of recruiting this specific population, influenced the attainable sample size. The exclusion criteria were as follows: i) being under 18 years old, ii) having a history of childhood SA or prior assaults, iii) exposure to other traumatic events (e.g., natural disasters, abduction, family-related homicide), or iv) a previous psychiatric diagnosis. The same exclusion

criteria were applied to the control group, with the additional requirement of no history of SA. Data collection took place during 2023 and 2024. An ethics committee approved the study, and all participants provided informed consent. Figure 1 displays the recruitment flowchart, and sociodemographic characteristics are presented in Table 1.

Figure 1.
Sample Recruitment Flowchart.

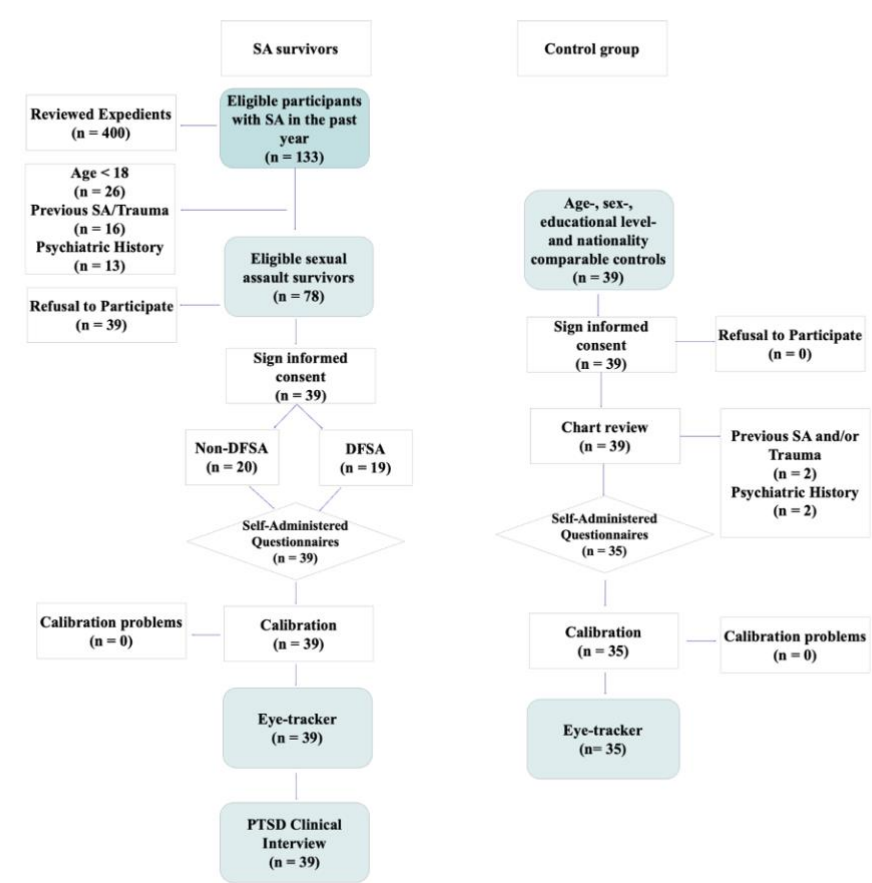


Table 1.*Sociodemographic details for non-DFSA survivors, DFSA survivors and control group*

	Non-DFSA(n= 20)	DFSA(n= 19)	Control (n= 35)	p
Females (n)	20	19	35	
Age	25.3 (7.29)	30.2 (8.81)	24.8 (5.17)	.069
Education (n)				.172
Primary studies	3	1	0	
Secondary studies	6	5	14	
University Studies	11	13	21	
Nationality (n)				.087
European	15(75%)	12(63.2%)	31(88.6%)	
Latin American	5(25%)	7(6.8%)	4(11.4%)	
Sexual Orientation (n)				.778
Heterosexual	16(80%)	15(78.9%)	30(85.7%)	
Homosexual	0	0	0	
Bisexual	4(20%)	4(21%)	5(14.3%)	
Religion (n)				.404
Believer	9(45%)	10(52.6%)	12(34.3%)	
Non-believer	11(55%)	9(47.4%)	23(65%)	
Marital Status (n)				.523
With a partner	8(40%)	7(36.8%)	18(51.4%)	
Without a partner	12(60%)	12(63.2%)	17(48.6%)	
Type of Sexual Assault (n)				.2
With penetration	8(40%)	15(78.9%)		
Without penetration	12(60%)	4(21.1%)		
Time since de assault	10.10(7.23)	8.58(5.75)		.475
Injuries after Sexual Assault (n)				.345
Severe (fractures, vaginal/anal tears)	4(20%)	2(10.5%)		
Mild (contusions)	9(45%)	6(31.6%)		
No injures	7(35%)	11(57.9%)		

Type of intake (n)			<.001
Voluntary intake	0	6(31.6%)	
Involuntary intake	0	3(15.8%)	
Mixed intake	0	10(53.6%)	
No intake	20(100%)	0	
Substance Ingested			
Alcohol		7(36.8%)	<.001
Other substances (drugs or medication)		3(15.8%)	
Mixed substances		9(47.4%)	
Report (n)	16(80%)	15(78.9%)	.935
Pregnancy (n)	0	0	
Memory of the assault			.037
No memories	3(15%)	8(42.1%)	
Partial memories	5(25%)	7(36.8%)	
Full memory	12(60%)	4(21.1%)	
Number of therapy sessions	4.4 (4.45)	2.36 (5.49)	.00
Number of perpetrators	1 (0.00)	1.15 (0.37)	.00
Age of aggressors	32.35 (13.56)	28.84 (14.69)	.00
Nationality of perpetrators (n)			.15
Same as the survivor	14(70%)	6(31.6%)	
Different from the survivor	6(30%)	13(68.4%)	
Male perpetrators (n)	20 (100%)	19(100%)	
Relationship with the perpetrator (n)			.13
Stranger	4(20%)	5(26.3%)	
Recent acquaintance	7(35%)	11(57.9%)	
Intimate relationship	9(45%)	3(15.8%)	
Scenario of the assault (n)			.33

Private	13(65%)	15(78.9%)	
Public	7(35%)	4(21.1%)	
Percived psychological consequences (n)	16(80%)	16(84.2%)	.73
Sexually transmitted infections (n)	5(25%)	3(15.8%)	.47

DFSA = drug-facilitated sexual assault; SA = sexual assault

Note. Data are presented as frequency (N) or means (M), with standard deviations (SD) shown in parentheses.

2.2. Materials

PTSD measures: PTSD symptoms were measured using the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5; Weathers et al., 2018), which assesses 20 items rated on a 0 to 4 severity scale. This provides a total score ranging from 0 to 80, as well as subscale scores corresponding to DSM-5 symptom clusters: re-experiencing (B), avoidance (C), negative alterations in cognition and mood (D), hyperarousal (E), and dissociation. The CAPS-5 has shown strong psychometric properties, including high internal consistency ($\alpha = .88$) and good test-retest reliability ($\kappa = .83$) (Weathers et al., 2018).

Eye-tracking paradigm: The stimuli consisted of 80 images from the International Affective Picture System (IAPS; Lang et al., 2005), the same set used by Kellough et al. (2008). The images were categorized into four emotional groups: happy, neutral, sad, and threatening. Although IAPS images are rated on two emotional dimensions—valence (1 = unpleasant, 5 = neutral, 9 = pleasant) and arousal (1 = calm, 9 = excited)—they are not sorted into specific discrete emotions. To clarify this, Kellough et al. (2008) conducted a pilot study to determine whether the unpleasant images were better described as threatening or sad. The task included 20 trials (12

experimental and 8 filler). Each trial started with a fixation cross in the center of the screen for 1000 ms, followed by a 20-second presentation of four images shown simultaneously. In the 12 experimental trials, each set of images included one from each emotional category (happy, neutral, sad, and threatening). Image positions were randomized within each trial, with the constraint that each emotional category appeared in each of the four quadrants exactly three times across the 12 trials. The order of trials was also randomized across participants. The 8 filler trials, designed to mask the purpose of the task, consisted of four neutral images each. See Figure 2 for an illustration of how a trial was presented.

Figure 2.

Example trial from the free-viewing task, showing the simultaneous presentation of four emotional scenes (happy, sad, neutral, and threatening).



Apparatus: Eye movements were recorded using a portable Tobii Pro Fusion Eye Tracker with a 250 Hz sampling rate; no chin-rest was used since the apparatus allowed head movement with a high-precision gaze tracking. Visual stimuli were

displayed on a 23.8" ASUS VA249HE Full HD (1920 × 1080) LED monitor with a 60 Hz refresh rate, positioned at a viewing distance of 60 cm.

2.3. Procedure

Participants completed demographic questionnaires and signed the informed consent before the eye-tracking session. They were seated in a height-adjustable chair in a dimly lit, sound-attenuated room. Participants were asked to fixate a point that moved to nine distinct locations on the screen, followed by a validation of four points, with acceptable error $<1.5^\circ$. The calibration was repeated until this criterion was met. Participants were instructed to free-view the images naturally, “as if looking at a photo album”. The experimenter monitored calibration and performance in real time.

2.4. Data analysis

Eye movement data were analyzed using a velocity-based algorithm, applying a minimum fixation duration threshold of 100 ms and a peak velocity threshold of $40^\circ/\text{s}$ to identify fixation events. No data were excluded from the analyses, as all eye-tracking calibrations were successfully completed. Each visual scene was treated as a single area of interest (AOI). To capture different stages of attentional processing, multiple eye-tracking indices were extracted. Early attention (i.e., orienting) was evaluated using two indicators: (i) initial fixation latency, reflecting the time (in milliseconds) required to direct gaze toward the target scene for the first time, and (ii) initial fixation probability, denoting the likelihood that the initial fixation occurred within the target AOI. Attentional engagement during the initial encounter with the stimulus was quantified by (iii) first-pass duration, defined as the total duration of fixations on the target scene before the gaze shifted elsewhere. Sustained attention, referring to the prolonged focus

over time, was assessed using two complementary metrics: (iv) percentage of total viewing time, indicating the proportion of the full 20-second display period spent fixating on the target (including re-fixations), and (v) percentage of total fixations, capturing the share of all fixations and re-fixations that fell within the target AOI throughout the trial.

Statistical analyses involved a 3 (Group: non-DFSA, DFSA, Control) $\times$ 4 (Valence: happy, sad, threatening, neutral) mixed-design ANOVA, with Group treated as a between-subjects variable and Valence as a within-subjects variable. When significant Group $\times$ Valence interactions emerged, simple effects analyses were conducted to examine differences across groups at each level of valence. To account for multiple comparisons, Bonferroni corrections were applied to post hoc tests involving the Group factor. Additionally, exploratory correlational analyses were carried out within the SA and DFSA subgroups to examine the relationship between eye movement indices and PTSD symptom severity, as assessed by total CAPS scores. All statistical analyses were conducted using SPSS (version 30.0.0).

2.5. Transparency and Openness

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study, in accordance with JARS guidelines (Appelbaum et al., 2018). All statistical analyses were conducted using SPSS (version 30.0.0). The study's design and analysis were not pre-registered. All data, analysis scripts, and research materials are available from the corresponding author upon reasonable request.

3. Results

Descriptive data for all attentional indices are presented in Table 2.

Table 2.

Eye-Tracking Measures for Neutral, Happy, Threatening, and Sad Stimuli Across Each Group

		Neutral	Happy	Threatening	Sad
Initial fixation latency (ms)	non-DFSA	3107,47(1614,96)	2415,83(1199,39)	2178(1370,48)	2488,18(1197,71)
	DFSA	3460,14(1268,22)	2559,55(1168,77)	2395,62(1353,99)	2492,06(912,03)
	Control	3633,97(1461,01)	2818,04(1282,61)	2998,97(1500,23)	2888,68(1161,79)
Initial fixation probability (%)	non-DFSA	23,75(9,07)	28,75(10,63)	25,42(8,62)	22,08(9,47)
	DFSA	21,49(8,01)	28,95(9,76)	22,81(9,14)	26,75(10,23)
	Control	21,32(11,24)	30,99(11,45)	22,69(10,74)	25(8,57)
First-pass duration (ms)	non-DFSA	990,29(674,8)	1328,52(619)	1474,67(993,86)	1564,74(913,45)
	DFSA	1185,34(665,26)	1597,85(918,55)	1474,43(559,84)	1605,67(906,57)
	Control	1446,84(814,5)	1970,6(942,83)	1805,19(872,97)	1976,10(1014,81)
Percentage of total duration (%)	non-DFSA	21,2(6,99)	27,64(7,88)	24,74(11,5)	26,49(5,08)
	DFSA	19,51(4,86)	23,61(5,78)	29,23(11,63)	28,39(3,52)
	Control	20,18(5,75)	30,99(8,18)	22,3(5,45)	26,64(5,2)
Percentage of total fixation (%)	non-DFSA	21,43(6,31)	27,85(6,2)	24,02(9,87)	26,72(4,16)
	DFSA	19,63(3,87)	25,25(5,95)	27,65(8,86)	28,09(2,55)
	Control	26,89(4,96)	30,68(7,82)	21,88(4,87)	26,89(4,96)

Note. Data are presented as means, with standard deviations shown in parentheses.

3.1. Initial fixation latency

A main effect of Valence was observed, $F(3, 213) = 27.08, p < .001, \eta^2 = .276$, 95% CI [0.206, 0.334], indicating differences in the time to first fixation across emotional scenes. No significant effects emerged for Group or the Valence $\times$ Group interaction (all $ps = .25$).

3.2. Initial fixation probability

A main effect of Valence was also found for the probability of initial fixation, $F(3, 213) = 5.31, p = .002, \eta^2 = .070$, 95% CI [.012, .133]. Participants showed a higher

probability of initially fixating on happy scenes compared to neutral ($p = .006$) or threatening scenes ($p = .031$). No interaction effects involving Group were found ($p = .71$).

3.3. First-pass duration

There was a significant main effect of Valence on first-pass duration, $F(3, 213) = 21.75, p < .001, \eta^2 = .235$, 95% CI [.135, .318], showing that first-pass durations were longer for emotional scenes compared to neutral ones (all $ps < .001$). No significant main effect of Group or Valence $\times$ Group interaction was found (all $ps > .09$).

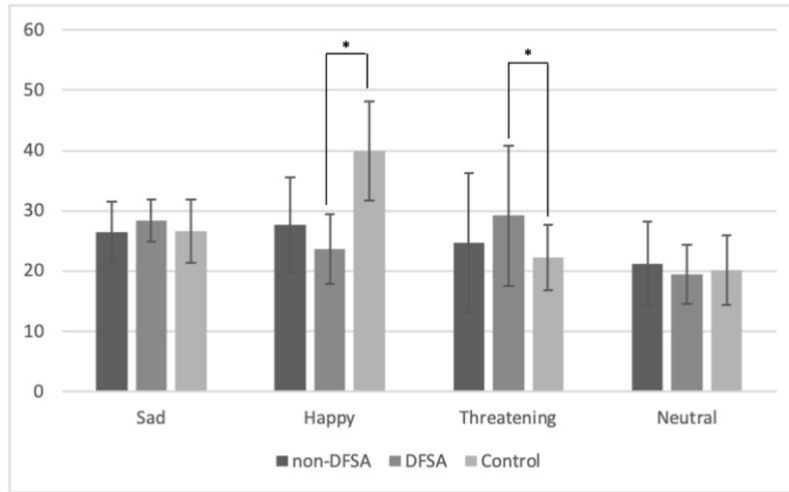
3.4. Percentage of total duration

The ANOVA of the percentage of total duration revealed an effect of Valence, $F(3, 213) = 11.35, p < .001, \eta^2 = .138$, 95% CI [.001, .043], which was qualified by a Valence $\times$ Group interaction, $F(6, 213) = 3.89, p = .003, \eta^2 = .087$, 95% CI [.006, .065]. No significant Group effect was found ($p = .37$).

To examine the Group $\times$ Valence interaction, we conducted simple effects tests of Group for each Valence. While a Group effect was found for happy images, $F(2, 73) = 5.93, p = .004$, and threatening ones, $F(2, 73) = 3.52, p = .035$, it was not found in sad and neutral images (all $ps > .37$). For happy images, the percentage of total duration was significantly shorter for the DFSA group compared to the control group ($p = .003$), no other differences were found (all $ps > .30$). For threatening images, the percentage of total duration was significantly longer for the DFSA group compared to the control group ($p = .029$), no other differences were found (all $ps > .39$). See Figure 3a.

Figure 3a.

Bar graph showing group differences in percentage of total duration in each emotional valence



Note: Bars represent mean values; error bars indicate the standard error of the mean.

Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

3.5. Percentage of total fixations

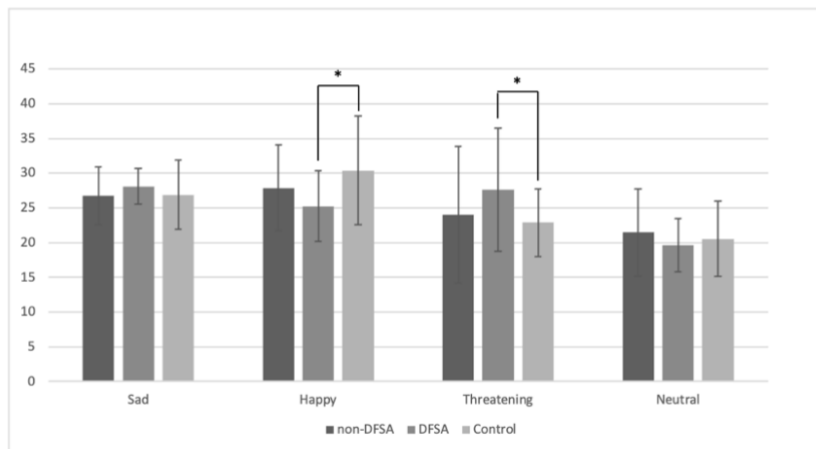
The ANOVA of the percentage of total fixations revealed an effect of Valence, $F(3, 213) = 15.43, p < .001, \eta^2 = .179$, 95% CI [.001, .043], which was qualified by a Valence x Group interaction, $F(6, 213) = 2.80, p = .012, \eta^2 = .073$, 95% CI [.006, .065]. No significant Group effect was found ($p = .21$).

To examine the Group x Valence interaction, we conducted simple effects tests of Group for each Valence. While a Group effect was found for happy images, $F(2, 73) = 5.93, p = .004$, and threatening ones, $F(2, 73) = 3.52, p = .035$, it was not found in sad and neutral images (all $ps > .37$). For happy images, the percentage of total fixations was significantly lower for the DFSA group compared to the control group ($p = .019$), no other differences were found (all $ps > .42$). For threatening images, the percentage of

total fixations was significantly higher for the DFSA group compared to the control group ($p = .028$), no other differences were found (all $ps > .41$). See Figure 3b.

Figure 3b.

Bar graph showing group differences in percentage of total fixations in each emotional valence



Note: Bars represent mean values; error bars indicate the standard error of the mean.

Statistically significant differences ($p < .05$) are denoted by an asterisk (*).

3.6. Correlational analyses

Exploratory correlations within the SA and DFSA groups revealed that greater avoidance symptom severity was associated with a lower percentage of total fixations and shorter total duration to threatening stimuli ($p = .040$ and $p = .046$, respectively), but with longer total duration and a higher percentage of total fixations for happy stimuli ($p = .017$ and $p = .011$). In addition, higher dissociative symptom severity was related to a greater percentage of total duration and total fixations on neutral images ($p = .008$ and $p = .003$) and to a lower percentage of total fixations on threatening scenes ($p = .029$). No other significant associations were found (all $ps > .06$).

4. Discussion

To the best of our knowledge, this is the first study to examine attentional biases during naturalistic free-viewing of socio-emotional stimuli (i.e., happy, sad, threatening, and neutral scenes) presented in competition among survivors of DFSA and non-DFSA. The main findings of this study can be summarized as follows: regarding the initial orienting, all participants were more likely to direct their first fixation toward happy scenes, while all emotional stimuli were fixated more quickly than neutral ones. Additionally, emotional stimuli also received a longer first-pass duration. Critically, differences between the groups emerged during later stages. Specifically, DFSA survivors showed greater sustained attention (i.e., greater percentage of total duration and fixations) to threatening stimuli compared to non-DFSA survivors and controls. Moreover, the DFSA group exhibited lower sustained attention toward happy scenes compared to the other groups. Finally, exploratory correlational analyses with PTSD symptoms revealed that greater severity of avoidance was associated with reduced sustained attention to threatening stimuli and increased sustained attention to happy ones. In contrast, higher levels of dissociative symptomatology were linked to increased sustained attention to neutral stimuli and fewer total fixations on threatening stimuli.

In terms of how emotional content modulates attentional allocation across different trauma backgrounds, DFSA survivors—unlike their non-DFSA counterparts and non-exposed controls—exhibited an attentional bias toward threatening scenes and away from happy ones. This may reflect the unique psychological characteristics of DFSA experiences, characterized by fragmented or absent memory, lack of a coherent trauma narrative, and significant uncertainty about what occurred during the assault,

which potentially compromises trauma integration and the subsequent emotional regulation and processing (see Saint-Martin et al., 2006 for a review). Notably, these attentional patterns were not accounted for by memory clarity, unlike findings in individuals with complex developmental trauma and long-standing memory processing patterns (McNally et al., 2000), as our additional analysis using memory recall (none, partial, or full) as an independent variable revealed no significant effects (all $F_s < 1$). Interestingly, the attentional biases in the DFSA group are similar to those of women with IPV (Lee and Lee, 2012). In survivors of both DFSA and IPV, an attentional bias toward threat cues may represent a heightened protective mechanism, following covert interpersonal betrayal where the threat is not easily identifiable. Additionally, an attentional bias away from happy scenes may suggest a reduced focus on seeking rewarding experiences. In contrast, only IPV survivors demonstrate increased dwell time on sad scenes, which may reflect an elaborative, rumination-linked processing of negative affect characteristic of chronic trauma. Critically, non-DFSA survivors did not show attentional biases toward any specific emotional content, suggesting possible affective blunting or attentional avoidance to dampen emotional arousal (Cisler & Koster, 2010). Alternatively, because threats in non-DFSA assaults are usually easily identifiable, attentional biases in this group may only emerge in the presence of sexually explicit cues (Pineles et al., 2009).

Regarding the stages of attentional processing, our findings suggest that attentional biases emerge primarily during more controlled phases of attention (such as sustained attention), rather than during the initial, automatic orienting phase. This pattern is consistent with the notion that controlled, voluntary attentional processes are more strongly influenced by trauma-related psychopathology, whereas early orienting tends to depend more on the inherent salience and characteristics of the stimuli

themselves (Armstrong et al., 2013; Eysenck et al., 2007). An alternative explanation could be related to the specific features of our task design, which presented participants with complex scenes and four images simultaneously, potentially diluting the impact of any single stimulus during early orienting. However, we consider this explanation less plausible given that Lee and Lee, who had presented a similar task in a sample of IPV survivors (Lee and Lee, 2012), designed a simplified version to specifically assess initial orienting, using only two facial expressions (one emotional vs. one neutral) (Lee and Lee, 2014). Despite this targeted design, they found no group differences in initial orienting; attentional biases only emerged during later stages, reinforcing the idea that trauma-related attentional alterations are more evident in controlled rather than automatic processes. This pattern may reflect disruptions in emotion regulation and attentional control among survivors (Gauntlett-Gilbert et al., 2004; Klanecky Earl et al., 2020).

Lastly, our findings highlight that different PTSD symptom clusters can shape attentional processing of emotional information. Specifically, among participants who experienced a SA, those reporting higher avoidance symptoms showed reduced attention to threatening scenes and greater attention to happy ones. Similarly, elevated dissociative symptoms were associated with increased attention on neutral stimuli and diminished attention to threatening scenes. Notably, these symptom-related patterns were more pronounced among non-DFSA survivors than DFSA survivors, which may partly explain the group differences in attentional biases. The present results are consistent with Emotional Processing Theory (Foa et al., 2007), which posits that avoiding trauma-related external cues can help reduce emotional distress. Thus, the tendency of non-DFSA survivors with high avoidance to direct attention away from threatening scenes but toward positively valenced stimuli may reflect an attempt to

counteract the affective burden of a vividly remembered trauma. Likewise, the association between dissociation and increased focus on neutral content aligns with the notion that dissociative states involve altered perceptual integration and reduced awareness of emotionally salient cues (APA, 2013). This supports evidence that dissociation can dampen responsiveness to emotional stimuli (Herzog et al., 2019), highlighting a distinct attentional strategy that may function as a protective buffer against overwhelming affect (Herzog et al., 2019; Lanius et al., 2010). Additionally, considering that both our groups (DFSA and non-DFSA survivors) showed comparable rates of PTSD diagnosis, our findings extend previous research by moving beyond categorical approaches and highlighting how specific PTSD symptom clusters can differentially shape attentional processing of emotional information. Prior studies have typically linked the presence of PTSD—as a single diagnostic entity—to attentional biases toward threatening cues (e.g., (Lazarov et al., 2019; Lee & Lee, 2012, 2014). However, treating PTSD as a unitary category may mask the unique ways in which distinct symptom dimensions, such as avoidance or dissociation, affect attentional patterns, particularly in the acute phase after trauma when these symptoms tend to be most prominent. Taken together, these results underscore the importance of examining PTSD at the symptom cluster level to better capture how different facets of posttraumatic stress influence attentional engagement with emotionally salient cues.

Despite these important findings, several methodological considerations that limit the generality of the conclusions should be acknowledged. First, the relatively small sample size resulted from the decision to exclude individuals with histories of childhood or prior adult SA, other traumatic events, or comorbid mental health conditions, which was designed to ensure a highly specific sample and to isolate the effect of DFSA, without the confounding influence of trauma chronicity or cumulative

exposure. This methodological choice enhances the specificity of the findings and contributes novel evidence about an under-researched group. Nevertheless, although this limited the number of eligible participants, it aligns with previous research using similar experimental designs and populations, where a small sample size is common (Lee & Lee, 2012, 2014). Second, the study exclusively included female participants, which could limit the generalizability of the findings to other populations. However, this focus was intentional and appropriate, given that sexual violence remains a gendered phenomenon that disproportionately affects women worldwide (Garcia-Moreno et al., 2005). Focusing on women allowed us to examine a population at higher risk, providing more nuanced insights into the psychological impact of SA. Another consideration is the use of non-sexual emotional images, which might not directly elicit trauma-specific responses. However, this was an intentional decision to avoid unnecessary distress while addressing one of the core aims of the study: to explore attentional bias in DFSA survivors whose traumatic experiences often involve ambiguity and fragmented memory. In this context, highly specific trauma cues might not meaningfully capture their subjective experience. Finally, although the simultaneous presentation of complex emotional scenes may limit the detection of subtle early orienting effects, it was deliberately chosen to enhance ecological validity.

Beyond its limitations, this study boasts notable methodological strengths. Building on the valuable insights provided by prior research using community samples of SA survivors and well-established attentional tasks such as the Stroop and dot-probe paradigms (Cassiday et al., 1992; Fleurkens et al., 2011; Foa et al., 1991; Hirai et al., 2022; Martinson et al., 2013; McNally et al., 2000), this research uniquely combines a well-defined clinical sample with eye-tracking technology. This approach not only increases the clinical relevance of the findings but also provides a detailed temporal

analysis of attentional processes across stages such as initial orienting, engagement, and sustained attention. Crucially, the task's design, presenting multiple emotional stimuli simultaneously, reflects real-world conditions where various emotional cues compete for attention. This design more closely approximates real-life conditions, where survivors must navigate environments filled with multiple competing emotional cues and manage limited attentional resources accordingly. Additionally, by evaluating PTSD symptoms dimensionally rather than categorically (Lee & Lee, 2014), the study captures more nuanced relationships between specific symptom clusters and attentional biases that categorical methods might overlook.

In conclusion, while DFSA survivors exhibited an attentional bias toward threatening and away from happy stimuli, no attentional biases were observed in the non-DFSA group. Additionally, not only the lack of memory, but also the specific clinical features of DFSA, such as uncertainty, confusion, and the absence of a coherent assault narrative, may play a critical role in shaping attentional responses to emotional stimuli. Indeed, the modulation of attentional biases depending on clinical features emerged during later and controlled stages of attentional processing, namely sustained attention, rather than initial orientation. Critically, different PTSD symptom clusters in SA survivors—specifically avoidance and dissociation—appear to shift attentional focus away from threatening stimuli toward neutral or happy ones. Notably, the non-DFSA group showed higher levels of avoidance and dissociation compared to the DFSA group, which could account for the lack of emotional modulation of attention observed in the non-DFSA participants. According to these findings, interventions for SA survivors should be tailored to their specific psychopathological profiles and the contextual characteristics of the assault. DFSA survivors may initially adopt heightened threat monitoring as a coping strategy in emotionally charged environments; however,

sustained hypervigilance and neglect of positive stimuli can reinforce a chronically threatening worldview, potentially leading to persistent anxiety. Therapeutic approaches for these individuals might focus on reducing perceived threat and enhancing attention to neutral or positive cues to support emotional balance. In contrast, non-DFSA survivors—often characterized by emotional numbing or disconnection—may benefit from interventions that foster reconnection with emotional experiences and gradual re-engagement with affective stimuli. These divergent adaptation pathways highlight the importance of nuanced, individualized treatment strategies. A deeper understanding of how psychopathological profiles interact with emotional information processing will contribute to more precise and effective trauma care.

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