

**Somatoforme Schmerzstörung:**  
**Zusammenhänge zwischen dem Bindungsstil, belastenden**  
**Kindheitserfahrungen, der Anzahl traumatischer Lebensereignisse**  
**und der sozialen Zurückweisungsempfindlichkeit.**  
*Ergebnisse einer Case-control study*

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## 1. Zusammenfassung

**Hintergrund und Ziele:** Die somatoforme Schmerzstörung ist eine häufig auftretende psychische Erkrankung in Deutschland. Sie ist gekennzeichnet durch einen subjektiv empfundenen, mindestens sechs Monate andauernden, intensiven Schmerz in einem Körperteil, der nicht ausreichend durch eine somatische Störung oder ein physiologisches Geschehen erklärt werden kann. Die Ursache dieser komplexen Störung scheint aus einem Zusammenspiel von mehreren Faktoren zu entstehen. Bisherige Untersuchungen zur Ätiologie und Aufrechterhaltung der somatoformen Schmerzstörung ziehen ein biopsychosoziales Modell zur Erklärung herbei, welches eine wechselseitige Interaktion der genetisch-biologischen, intra- und innerpsychologischen sowie sozialen Faktoren beschreibt. Jedoch ist die Ätiologie dieser Erkrankung bisher noch nicht abschließend verstanden und untersucht worden. Ziel der vorliegenden Arbeit war es, angeknüpft an frühere Ergebnisse, weitere Erkenntnisse über die komplexen Zusammenhänge zu gewinnen. In der vorliegenden Arbeit lag der Fokus auf belastenden Kindheitserlebnissen, traumatischen Lebensereignissen, dem Bindungsstil (Teilstudie I) und der Zurückweisungsempfindlichkeit in interpersonellen Interaktionen (Teilstudie II). Ziel dieser Arbeit war es, die Zusammenhänge dieser Faktoren an einer diagnostisch gut abgeklärten und repräsentativen Stichprobe zu untersuchen und mit einer alters- und geschlechtsgleichen, gesunden Kontrollgruppe zu vergleichen. Es wurde untersucht, ob Patient\*innen mit einer somatoformen Schmerzstörung häufiger einen unsicheren Bindungsstil aufweisen und häufiger über kritische, traumatische Ereignisse berichten als gesunde Kontrollpersonen. Ferner war das Ziel die Untersuchung der korrelativen Zusammenhänge zwischen einer unsicheren Bindung, der Anzahl traumatischer Lebensereignisse und traumatischer Kindheitserlebnisse und einer somatoformen Schmerzstörung (Teilstudie I). Da die Zurückweisungsempfindlichkeit häufig mit psychischen Störungen in Verbindung gebracht wird, aber bei Patient\*innen mit einer somatoformen Schmerzstörung bisher nicht erforscht wurde, war es auch ein Ziel, die Ausprägung der Zurückweisungsempfindlichkeit bei dieser Patient\*innengruppe zu untersuchen. Außerdem wurde auch der Zusammenhang zwischen den verschiedenen psychischen Faktoren und der Zurückweisungsempfindlichkeit sowie der potenziell moderierende Einfluss der somatoformen Schmerzstörung analysiert (Teilstudie II).

**Methode:** Zur Beantwortung der Fragestellungen wurde ein Case-Control-Design konzipiert. Im Zeitraum von August 2014 bis Mai 2015 wurden 100 Patient\*innen mit der (Verdachts-) Diagnose einer somatoformen Schmerzstörung zur Teilnahme an der Studie eingeladen. 65 Pa-

tient\*innen stimmten der Studienteilnahme zu. Zur Sicherstellung der Diagnose der somatoformen Schmerzstörung sowie komorbider affektiver Störungen wurde mit allen teilnehmenden Patient\*innen ein strukturiertes, klinisches Interview zur Diagnostik von psychischen Störungen (SKID-I) nach DSM-4 (Diagnostisches und statistisches Manual psychischer Störungen) durchgeführt. Eine alters- sowie geschlechtsangepasste, gesunde Kontrollgruppe mit 65 Teilnehmer\*innen wurde ebenfalls rekrutiert und dem klinischen Interview (SKID-I) unterzogen, um das Vorhandensein von psychischen Störungen auszuschließen. Folgende validierte Selbstbeurteilungsfragebögen wurden eingesetzt: Gesundheitsfragebogen zur Erfassung depressiver und somatischer Symptome (Patient Health Questionnaire, PHQ-9, PHQ-15), Bindungsfragebogen (Relationship Questionnaire, RQ), Erfassung traumatischer Lebensereignisse (Essener Trauma-Inventar, ETI), Fragebogen zu Kindheitstraumata (Childhood Trauma Questionnaire, CTQ-34), Fragebogen zur sozialen Zurückweisungsempfindlichkeit (Rejection Sensitivity Questionnaire, RSQ).

**Ergebnisse:** In der Teilstudie I wurde der unsichere Bindungsstil bei Patient\*innen mit einer somatoformen Schmerzstörung signifikant häufiger (60%) als bei gesunden Probanden\*innen (14%;  $p < 0.001$ ) beobachtet. Patient\*innengruppe erreichte zudem signifikant höhere Werte im Fragebogen zu Kindheitstraumata (CTQ) als gesunden Kontrollpersonen, darunter waren die Skalen emotionale und körperliche Vernachlässigung klinisch auffällig. Ein starker Zusammenhang zwischen der somatoformen Schmerzstörung und dem unsicheren Bindungsstil (odds ratio, OR= 11.20, 95% CI: 1.32-94.86), depressiven Symptomen (OR= 3.35, 95% CI: 1.84-6.11) und der Anzahl traumatischer Ereignisse (OR= 2.04, 95% CI: 1.06-3.92) war zu verzeichnen (86,2% Varianzaufklärung) (Teilstudie I). Auch wiesen Patient\*innen mit einer somatoformen Schmerzstörung eine höhere Zurückweisungsempfindlichkeit im Vergleich zur gesunden Kontrollgruppe ( $M = 10.30$ ,  $SD = 5.64$ ;  $M = 6.13$ ,  $SD = 2.50$ ;  $p < 0.001$ ;  $d = 0.95$ ) auf. Depressive Symptome ( $p < 0.001$ ), belastende Kindheitserlebnisse ( $p < 0.001$ ) sowie unsicherer Bindungsstil ( $p < 0.001$ ) waren mit der Zurückweisungsempfindlichkeit signifikant assoziiert, auf die die somatoforme Schmerzstörung keinen moderierenden Effekt hatte (Teilstudie II).

**Schlussfolgerungen:** Der hohe prädiktive Wert des unsicheren Bindungsstils und der kumulative Einfluss traumatischer Ereignisse unterstreichen die Bedeutung als mögliche Risikofaktoren für die Entstehung und Aufrechterhaltung einer somatoformen Schmerzstörung. Darüber hinaus bestätigte sich in der Teilstudie II die hohe Zurückweisungsempfindlichkeit der Patient\*innen mit einer somatoformen Schmerzstörung und ebenfalls die Bedeutung als ein Risikofaktor für die Entstehung oder Aufrechterhaltung des Störungsbildes. Ferner konnte gezeigt werden, dass ein unsicherer Bindungsstil, depressive Symptome und belastende Kindheitserfahrungen

stark mit der Zurückweisungsempfindlichkeit assoziiert waren. Längsschnittstudien sind erforderlich, um herauszufinden, wie die Zurückweisungsempfindlichkeit mit der somatoformen Schmerzstörung über die gesamte Lebensspanne zusammenhängt und wie der Bindungsstil und die traumatischen Lebensereignisse die Genese einer somatoformen Schmerzstörung bedingen.

## **2. Einordnung in den wissenschaftlichen Kontext**

### **2.1 Definition, Epidemiologie und Komorbiditäten der somatoformen Schmerzstörung**

#### **2.1.1 Definition**

Die somatoforme Schmerzstörung stellt im internationalen Klassifikationssystem psychischer Störungen (ICD-10) der Weltgesundheitsorganisation (WHO) eine Unterform der somatoformen Störung dar [1]. Sie ist gekennzeichnet durch einen subjektiv empfundenen, mindestens sechs Monate andauernden, quälenden Schmerz in einem Körperteil, der nicht adäquat durch eine somatische Störung oder ein physiologisches Geschehen erklärt werden kann [1]. Die Beschwerden verursachen in klinisch bedeutsamer Weise bei den Patient\*innen hohes Leiden und/oder Beeinträchtigungen in sozialen, beruflichen und anderen wichtigen Funktionsbereichen des Lebens [1]. Häufig treten die Schmerzen in Verbindung mit emotionalen Konflikten oder psychosozialen Belastungen auf. Im ICD-10 [1], welches derzeit noch in Deutschland im klinischen Setting als diagnostisches Klassifikationssystem Anwendung findet, wird zwischen zwei Formen der somatoformen Schmerzstörung unterschieden. So kann eine -somatoforme Schmerzstörung mit somatischen und psychischen Faktoren- mit F45.41 kodiert werden, welche eine Schmerzsymptomatik beschreibt, die durch ein physiologisches Geschehen induziert wurde, aber im späteren Verlauf durch psychische Faktoren aufrechterhalten wird und die primär vorhandene somatische Ursache nicht hinreichend das Beschwerdebild der Patient\*innen erklären kann. Die andere Form der somatoformen Schmerzstörung ist die -anhaltende somatoforme Schmerzstörung- kodiert mit F45.40 die dagegen primär, ohne vorheriges somatisches bzw. physiologisches Geschehen, entsteht und die offensichtlich durch psychologische Faktoren zu einer Chronifizierung führt. In der 11. Version des internationalen Klassifikationssystems psychischer Störungen der Weltgesundheitsorganisation (ICD-11) [2] findet keine strenge Trennung zwischen organisch bedingten und psychogenen Schmerzen mehr statt. Im DSM-5 [3] wird ebenfalls zwischen organisch bedingten und psychogenen Schmerzen nicht mehr unterschieden. Unabhängig vom Vorliegen einer somatischen Erklärung sind für die Vergabe dieser Diagnose neben dem Zeitkriterium (mindestens 6 Monate) auch das Leid und/ oder Beeinträchtigung in vielen wichtigen Funktionsbereichen des Lebens ausschlaggebend. Äußern Patient\*innen exzessive Gedanken, Gefühle oder Verhaltensweisen rund um die Schmerzsymptomatik und/oder damit einhergehende Gesundheitssorgen, kann die Diagnose vergeben wer-

den. Dabei wird die somatoforme Schmerzstörung im DSM-5 unter somatische Belastungsstörung (*somatic symptom disorder*) zusammengefasst und nicht (mehr) als eigenständige Diagnose vergeben [3].

Das klinische Erscheinungsbild der somatoformen Schmerzstörung hat, wie auch die anderen Formen der somatoformen Störungen, sehr charakteristische Merkmale. Patient\*innen mit einer somatoformen Schmerzstörung halten trotz wiederholter negativer Befunde und ärztlicher Versicherung an einer körperlichen Ursache fest und sind weniger zugänglich für eine psychosomatische Betrachtungsweise ihrer Beschwerden [4]. Zum klinischen Bild gehört meist auch eine belastende bzw. schwierige Arzt-Patient-Beziehung. Die Patient\*innen berichten oft über das Gefühl einer Stigmatisierung wegen wiederholt erlebter „Zurückweisungen“ und „Enttäuschungen“ durch die Behandler sowie auch durch die Mitmenschen. Dies trägt wiederum zur Verschlechterung ihrer Beschwerden und zugleich zur Erhaltung des eigenen somatischen Krankheitskonzepts bei [4]. Häufig kommt es bei Patient\*innen aufgrund dieser Zurückweisungen und Enttäuschungen auch zu einem häufigen Arztwechsel (*doctor hopping*) und dementsprechend zu wiederholenden Einforderungen von somatischen Untersuchungen bzw. Abklärungen [4-7]. Oftmals geht damit eine hohe und dysfunktionale Inanspruchnahme des Gesundheitssystems einher. Aus der Analyse im Jahr 2008-2019 von Häuser und Kollegen [8] ging hervor, dass die durchschnittlichen direkten und indirekten Krankheitskosten pro Patient bei 2009-5500 € im Jahr lagen. Die somatoforme Schmerzstörung stellt somit nicht nur eine rein medizinische, sondern auch eine ökonomische Herausforderung dar.

### **2.1.2 Epidemiologie**

Somatoforme Schmerzen sind sowohl in der Primärversorgung als auch im Fach Psychosomatik ein häufiges Beschwerdebild [9-13]. In einer repräsentativen Untersuchung von Jacobi und Kollegen [9] aus dem Jahr 2014 wurde innerhalb der deutschen Allgemeinbevölkerung für die somatoforme Schmerzstörung eine 12-Monatsprävalenz von 3.2% festgestellt. Eine frühere Untersuchung aus dem Jahr 2006 von Fröhlich und Kollegen [12] ergab eine 12-Monatsprävalenz von 7-8% in einer ebenfalls bevölkerungsrepräsentativen Stichprobe. Weiterhin zeigte eine Studie [13] aus dem Jahr 2020 auf Grundlage einer repräsentativen Bevölkerungsumfrage eine Prävalenz von 4,5% für die somatoforme Belastungsstörung. Die Schwankungen in den Prävalenzen sind oftmals auf die untersuchte Population und auf die unterschiedlichen Klassifikationssysteme, die zur Diagnose herangezogen wurden, zurückzuführen.



### **2.1.3 Komorbiditäten**

Viele Studien weisen hohe Komorbiditäten der somatoformen Störung mit anderen psychischen Störungen auf. Insbesondere ist eine hohe Komorbidität zwischen Depression und somatoformen Schmerzen feststellbar. Aus einer Publikation aus dem Jahr 2020 ging hervor, dass 87% der Patient\*innen mit einer somatoformen Schmerzstörung (35 von 40 Patient\*innen) über mittelschwere bis schwere depressive Symptome berichteten [14]. In einer Studie von Gündel und Kollegen [15] wurde ebenfalls eine erhöhte Inzidenz für Depression bei Patient\*innen mit einer somatoformen Schmerzstörung beobachtet. Aus den Ergebnissen einer Metaanalyse von Bair und Kollegen (2003) geht auch hervor, dass 50% der Schmerzpatient\*innen eine Depression haben und umgekehrt auch zwei Drittel der Patient\*innen mit einer Depression von Schmerzsymptomen berichten [16]. In einer Untersuchung von Nickel und Kollegen [17] konnte bei 69% der untersuchten Personen (N= 282) neben der somatoformen Schmerzstörung eine weitere psychische Störung diagnostiziert werden, vor allem Depression oder/und Angststörungen. Bei 14% konnte auch komorbid eine Persönlichkeitsstörung festgestellt werden.

## **2.2 Ätiologische Faktoren der somatoformen Schmerzstörung**

Bisherige Forschungsbefunde legen nahe, dass ungünstige frühere Kindheits- und Sozialisationserfahrungen in Wechselwirkung mit genetischen und biologischen Faktoren die Entstehung und Aufrechterhaltung der somatoformen Schmerzstörung begünstigen [18]. Es wird vermehrt ein komplexes biopsychosoziales Erklärungsmodell herangezogen [18, 19] und doch sind diese Zusammenhänge bis dato noch unzureichend erforscht. Für ein besseres Verständnis und für bessere Therapieerfolge ist es daher notwendig, diese Zusammenhänge weiter zu erforschen. Im Folgenden werden die meist postulierten biographisch-psychologischen Faktoren, die auch Gegenstand der vorliegenden Arbeit sind, in Kürze dargestellt.

### **2.2.1 Bindung und somatoformer Schmerz**

Die von Bowlby entwickelte Bindungstheorie [20] basiert auf der Annahme, dass frühkindliche Erfahrungen mit den primären Bezugspersonen unsere späteren interpersonellen und intrapersonellen Beziehungen beeinflussen. Sich wiederholende Interaktionserfahrungen führen bereits im frühen Kindesalter zur Entwicklung eines stabilen Bindungsmusters. Dabei unterscheidet Bowlby [20] zwischen dem sicheren und unsicheren Bindungsmuster. Wird die Interaktionsperson immer wieder als unterstützend und zuverlässig erlebt, entwickelt sich ein sicheres Bin-

dungsmuster. Werden dagegen mit dem Interaktionspartner (insbesondere primäre Bezugspersonen) unzuverlässige und nicht unterstützende Erfahrungen gemacht, entwickelt sich mit höherer Wahrscheinlichkeit ein unsicheres Bindungsmuster, das sich auch im Erwachsenenalter manifestiert. Eine durch (emotionale) Zurückweisung und Deprivation geprägte Kindheit löst somit ein unsicheres Bindungsmuster beim Kind und später im Erwachsenenalter aus. Innerhalb des unsicheren Bindungsmusters werden nach Bowlby drei unterschiedliche Typen angenommen (ängstlich-vermeidend, vermeidend-ablehnend und anklammernd). Die unterschiedlichen Typen resultieren aus den Erfahrungen mit primären Bezugspersonen. Während Menschen mit einem gesunden, sicheren Bindungsmuster ein positives Selbst- und Fremdbild besitzen, sind Menschen mit einem unsicheren Bindungsmuster geprägt von einem negativen Selbst- und/o-der Fremdbild. Gemäß der Bindungstheorie geht eine sichere Bindung mit einer besseren Stressresilienz bzw. hoher Stresstoleranz einher und das Fehlen der sicheren Bindung mit einer erhöhten Reagibilität bei Stress [z.B. 21, 22].

Aus der Reviewarbeit von Meredith und Kollegen [23] und der Metaanalyse von Porter und Kollegen [24] geht hervor, dass ein unsicherer Bindungsstil mit dysfunktionalem Umgang mit Schmerz einhergeht und einen Risikofaktor für die Entstehung von chronischen Schmerzen darstellt. In einer anderen (Review-) Arbeit wird die unsichere Bindung als ein Vulnerabilitätsfaktor für die Entstehung und Aufrechthaltung von chronischen Schmerzen postuliert [18]. Ciechanowski und Kollegen [25] konnten zeigen, dass Individuen mit einer chronischen Schmerzstörung signifikant häufiger einen unsicheren (ängstlichen) Bindungsstil aufweisen als gesunde Kontrollen. In einer anderen Studie von Taylor und Kollegen (2000) [26] konnte ebenfalls gezeigt werden, dass Patient\*innen mit somatoformen Schmerzen häufiger unsicher gebunden waren als Patient\*innen mit somatisch erklärbaren Schmerzen.

### **2.2.2 Traumatisierende Kindheits-/Lebensereignisse und somatoformer Schmerz**

Biographische Belastungsfaktoren, welche ebenfalls zur Entwicklung einer unsicheren Bindung beitragen, werden eng mit der Entwicklung und Aufrechthaltung somatoformer Schmerzen in Zusammenhang gebracht. Bei Patient\*innen mit einer somatoformen Schmerzsymptomatik werden im klinischen Setting psychosoziale und (früh-) biographische Belastungsfaktoren häufig beobachtet. In sämtlichen wissenschaftlichen Arbeiten wurde z.B. chronische Disharmonie, elterliche Vernachlässigung, emotionale und körperliche sowie sexuelle Missbrauchserfahrungen häufig in Zusammenhang mit einer somatoformen Schmerzstörung gestellt [z.B. 27-30]. Eine Übersichtsarbeit zeigt, dass Missbrauchserfahrungen in der Kindheit die Ent-

wicklung einer somatoformen Schmerzstörung in späteren Lebensjahren begünstigen [31]. Insbesondere Patient\*innen, die mehr als ein negatives Erlebnis in der Vergangenheit hatten, berichteten vermehrt von somatoformen Symptomen bzw. Schmerzen als Patient\*innen, die nur ein negatives Erlebnis aufwiesen [32]. Eine andere Untersuchung von Sack und Kollegen [33] zeigte, dass 48% der Patient\*innen mit einer somatoformen Schmerzstörung in ihrer Anamnese über sexuellen Missbrauch berichteten.

In einer anderen Studie [33] wurde gezeigt, dass Patient\*innen mit einer somatoformen Schmerzstörung mehr Stressfaktoren aufwiesen, die mit chronischen zwischenmenschlichen Beziehungskonflikten oder dem Verlust nahestehender Personen zusammenhängen als Patient\*innen ohne Schmerzsymptome. Eine aktuelle Studie [34] konnte ebenfalls zeigen, dass eine höhere Anzahl belastender (frühkindlicher) Lebensereignisse mit einer schlechteren Lebensqualität im späteren Leben und einem dysfunktionalen Umgang mit Schmerzen assoziiert ist.

### **2.2.3 Soziale Zurückweisungsempfindlichkeit und somatoformer Schmerz**

Eines der angeborenen menschlichen Grundbedürfnisse ist das Zugehörigkeitsgefühl. Baumeister und Leary (1995) betonen in ihrer „Need to belong“-Theorie [35], dass Menschen ein grundlegendes Bedürfnis haben, von anderen Menschen akzeptiert zu werden und sich zugehörig zu fühlen.

Ist das Bedürfnis nach Zugehörigkeit nicht erfüllt, folgen negative emotionale, kognitive und verhaltensbezogene Konsequenzen [36]. Kurzfristige Konsequenz sind in der Regel physiologische und emotionale Stressreaktionen. Längerfristige Reaktionen dagegen können eine erhöhte Vulnerabilität bzw. Sensitivität auf soziale Reize sein. Downey und Feldman [36] definierten hierzu das Wort *Rejection sensitivity* (Zurückweisungsempfindlichkeit). Unter Zurückweisungsempfindlichkeit wird die allgemeine Erwartung von Zurückweisung, die erhöhte Vigilanz für potenzielle Signale einer Zurückweisung und übermäßige Reaktion auf Zurückweisung verstanden. Menschen mit einer hohen Zurückweisungsempfindlichkeit erwarten mit höherer Wahrscheinlichkeit von anderen Menschen zurückgewiesen zu werden, nehmen Ablehnungen schneller wahr und reagieren entsprechend auch empfindlicher [36].

Oft scheint der Beginn einer sozialen Zurückweisungsempfindlichkeit schon in der frühen Kindheit zu sein. Frühe und wiederholte Erfahrungen von sozialem Schmerz wie emotionale Vernachlässigung oder Missbrauch durch primäre Bezugspersonen können die Entwicklung einer Empfindlichkeit gegenüber sozialen Zurückweisungen erhöhen [36]. Downey und Feldmann [36] postulierten, dass Ablehnungserfahrungen in der Kindheit und Jugend einen wesentlichen Faktor für eine hohe Empfindlichkeit gegenüber Ablehnung im späteren Leben bilden.

Zahlreiche Studien zeigen, dass eine hohe Zurückweisungsempfindlichkeit mit anhaltenden und maladaptiven Erfahrungen aus der Kindheit assoziiert ist [z.B. 37-39]. In Studien wird ebenfalls häufig der Zusammenhang zwischen hoher Zurückweisungsempfindlichkeit und unsicherem Bindungsstil deutlich [z.B. 40, 41].

Oftmals ergeben sich bei Menschen mit einer hohen Zurückweisungsempfindlichkeit negative Konsequenzen wie ein negatives Selbstbild, soziale Interaktionsschwierigkeiten (da sie empfindlich oder fragil reagieren) aber auch eine erhöhte psychische Belastung, insbesondere wenn das Bedürfnis nach sozialer Zugehörigkeit chronisch frustriert wird. Somit scheint eine hohe Zurückweisungsempfindlichkeit einen Vulnerabilitätsfaktor für psychische Störungen darzustellen. Die Ergebnisse einer Meta-Analyse zeigen einen Zusammenhang zwischen der Zurückweisungsempfindlichkeit und psychischen Störungen, wie Depressionen, Angst, Borderline Persönlichkeitsstörung [42]. Da psychische Störungen ebenfalls zu einer erhöhten Empfindlichkeit in sozialen Situationen führen, können diese eine soziale Zurückweisungsempfindlichkeit auslösen und/oder verstärken [42]. Zusammenfassend lässt sich sagen, dass Zurückweisungsempfindlichkeit bei psychischen Störungen eine wichtige Rolle spielt. Untersucht wurde die soziale Zurückweisungsempfindlichkeit allerdings bisher noch nicht an Patienten\*innen mit einer somatoformen Schmerzstörung.

Patient\*innen mit einer somatoformen Schmerzstörung zeichnen sich oftmals durch eine schnelle Kränkbarkeit und Verletzlichkeit in zwischenmenschlichen Beziehungen aus. Dieses zeigt sich bereits in Arzt-Patient-Beziehungen, die durch Misstrauen, Hilfslosigkeit und Frustrationen geprägt zu sein scheinen. Sie fühlen sich nicht verstanden und abgewiesen, so dass sie oft dysfunktional reagieren (z.B. mit frequentem Aufsuchen von Ärzten, „*Doctor-hopping*“) [43, 44].

Ferner existieren zahlreiche Untersuchungen, die nahe legen, dass dem physischen und sozialen Schmerz (z.B. das Erleben von sozialer Zurückweisung) ein sehr ähnliches neuronales Aktivierungsmuster zugrunde liegt [45, 46]. Dies impliziert, dass eine (Über-) Empfindlichkeit gegenüber einer (körperlichen) Schmerzform mit einer (Über-) Empfindlichkeit gegenüber der anderen (emotionalen) Schmerzform einhergeht. So könnte eine gesteigerte Sensibilität für soziale Zurückweisung bzw. sozialen Schmerz (beispielsweise durch chronische negative Erfahrungen in der Kindheit) die Entwicklung einer chronischen Schmerzsymptomatik begünstigen und/oder aufrechterhalten und auch umgekehrt.

### **3. Fragestellungen der Publikationen**

Der aktuelle Forschungsstand zur Ätiologie der somatoformen Schmerzstörung und deren aufrechterhaltenden Faktoren lässt noch viele Fragen offen. Einigen Fragen soll im Rahmen dieser Arbeit, in Teilstudie I [47] und II [48], nachgegangen werden.

#### **3.1. Fragestellungen der Teilstudie I**

Im klinischen Setting scheint die Beziehung zwischen der unsicheren Bindung, negativen (traumatisierenden) Erlebnissen und der somatoformen Schmerzstörung offensichtlich zu sein, dennoch gibt es nicht genügend wissenschaftliche Untersuchungen, die dieses Bedingungsgefüge erforschen. Nach unserer Kenntnis gibt es keine Studien, die die Anzahl traumatischer Ereignisse sowie verschiedene Facetten der traumatisierenden Erfahrungen aus der Kindheit und den Bindungsstil in ein und derselben Studie untersucht haben.

Ziel der vorliegenden Arbeit war es, an frühere, wissenschaftliche Ergebnisse anzuknüpfen und weitere Erkenntnisse über den Zusammenhang zwischen somatoformen Schmerzen, Anzahl traumatischer Lebensereignisse und Kindheitserfahrungen und unsicherer Bindung anhand einer gut evaluierten Patient\*innengruppe im Vergleich zu einer alters- und geschlechtsangepassten, gesunden Kontrollgruppe zu gewinnen.

Wir nahmen an, dass der unsichere Bindungsstil häufiger bei Patient\*innen mit einer somatoformen Schmerzstörung auftritt im Vergleich zu gesunden Kontrollpersonen. Diese Hypothese beruht sowohl auf klinischen Beobachtungen als auch auf Befunden vorangegangener Studien [z.B. 21-24]. Zudem nahmen wir an, dass Patient\*innen mit einer somatoformen Schmerzstörung häufiger traumatische Lebensereignisse und negative Erlebnisse in der Kindheit aufweisen als gesunde Kontrollpersonen. Ferner gingen wir davon aus, dass eine unsichere Bindung und die Anzahl traumatischer Lebensereignisse sowie Kindheitserfahrungen psychologische Risikofaktoren darstellen, die die Entstehung einer somatoformen Schmerzstörung präzisieren.

#### **3.2 Fragestellungen der Teilstudie II**

Die derzeitige Befundlage zeigt, dass sowohl Zurückweisungsempfindlichkeit zu psychischen Störungen beitragen kann als auch umgekehrt [42]. Eine erhöhte Vigilanz und Sensibilität für potenzielle Signale einer Zurückweisung und damit einhergehende übermäßige Reaktion auf Zurückweisung wird bei Patient\*innen mit einer somatoformen Schmerzstörung häufig in sozialen Interaktionen, aber auch im klinischen Setting beobachtet. Nach aktuellem Wissensstand wurde bislang in keiner Studie der Zusammenhang zwischen Zurückweisungsempfindlichkeit

und somatoformen Schmerzen untersucht. Zu diesem Zweck wurde in der vorliegenden Studie untersucht, ob Patient\*innen mit somatoformer Schmerzstörung (F45.40 oder F45.41) eine höhere Zurückweisungsempfindlichkeit aufweisen als gesunde Kontrollpersonen. Wir nahmen an, dass Patient\*innen mit einer somatoformen Schmerzstörung eine signifikant höhere Zurückweisungsempfindlichkeit aufweisen als gesunde Kontrollpersonen. Zudem nahmen wir an, dass unabhängig vom Vorliegen einer Schmerzsymptomatik Teilnehmer\*innen mit einem unsicheren Bindungsstil zurückweisungsempfindlicher sind als Teilnehmer\*innen mit einem sicheren Bindungsstil. Ferner wurde untersucht, inwieweit negative Kindheitserfahrungen, ein unsicherer Bindungsstil, depressive Symptome, die Anzahl traumatischer Erlebnisse sowie das Vorhandensein einer somatoformen Schmerzstörung mit einer Zurückweisungsempfindlichkeit assoziiert sind. Die Annahme war, dass das Vorhandensein einer somatoformen Schmerzstörung den Zusammenhang zwischen depressiven Symptomen und sozialer Zurückweisungsempfindlichkeit moderiert. Hierzu wurde eine multiple, lineare Regressionsanalyse durchgeführt.

## 4. Methodik

Zur Beantwortung der Fragestellungen dieser Arbeit wurde von der Doktorandin (Yeliz Nacak) gemeinsam mit Prof. Yesim Erim ein Case-Control-Design konzipiert. Diese wurde der Ethikkommission der Friedrich-Alexander-Universität Erlangen-Nürnberg vorgelegt und von ihr bewilligt (Projektidentifikationsnummer 46\_14B). Im Rahmen der Studie wurden im Zeitraum von August 2014 bis Mai 2015 100 Patient\*innen mit der (Verdachts-) Diagnose einer somatoformen Schmerzstörung zur Teilnahme an der Studie durch die Doktorandin (Yeliz Nacak) befragt. Die Patient\*innen befanden sich entweder in einer ambulanten oder teil-/stationären Behandlung in der psychosomatisch-psychotherapeutischen Abteilung der Uniklinik Erlangen oder nahmen an einer ambulanten Schmerzgruppe des multidisziplinären Schmerzzentrums der Anästhesiologie der Uniklinik Erlangen teil. Von den 100 Patient\*innen stimmten 65 Patient\*innen der Studienteilnahme zu. Die Teilnahme an der Studie wurde von 35 Patient\*innen aus unterschiedlichen Gründen (z.B. keine Zeit, kein Interesse, logistische Gründe, Thema der Studie belastend) abgelehnt. Zwischen teilnehmenden Patient\*innen und Non-Respondern gab es keinen signifikanten Unterschied in der Geschlechterverteilung und bezüglich Alter. Die teilnehmenden Patient\*innen wurden durch die Doktorandin sowohl mündlich als auch schriftlich über die Studie ausführlich aufgeklärt und erteilten ihre schriftliche Einwilligung.

Zur Sicherstellung der Diagnose der somatoformen Schmerzstörung sowie komorbider affektiver Störungen wurde mit allen Patient\*innen ein strukturiertes, klinisches Interview zur Diagnostik von psychischen Störungen (SKID-I) nach DSM-4 (Diagnostisches und statistisches Manual psychischer Störungen) [49] durch die Doktorandin durchgeführt. Eine alters- sowie geschlechtsangepasste Kontrollgruppe wurde mithilfe von Aushängern in der Bücherei und in der Uniklinik (Klinikpersonal) rekrutiert. Diese wurden ebenfalls von der Doktorandin dem klinischen Interview (SKID-I) [49] unterzogen, um das Vorhandensein von psychischen Störungen auszuschließen.

Zur Beantwortung der Fragestellungen der hiesigen Arbeit wurden validierte, international bekannte Selbstbeurteilungsfragebögen eingesetzt. Der Bindungsstil wurde mit dem Bindungsfragebogen *Relationship Questionnaire* (RQ) [50] und die Anzahl traumatischer Ereignisse mit dem *Essener Trauma-Inventar* (ETI) [51] erfasst. Der Fragebogen zu Kindheitstraumata *Childhood Trauma Questionnaire* (CTQ) [52] wurde eingesetzt, um kindliche traumatische Erlebnisse abzubilden. Der Gesundheitsfragebogen *Patient Health Questionnaire* [53] wurde zur Erfassung depressiver Symptome (PHQ-15) und zur Erfassung somatischer Symptome (PHQ-9) eingesetzt. Zur Erfassung der sozialen Zurückweisungsempfindlichkeit wurde die validierte,

deutsche Version des Fragebogens Rejection Sensitivity Questionnaire (RSQ) eingesetzt [54]. Eine tabellarische Übersicht der eingesetzten Fragebögen ist auf Seite 23 zu finden. Alle Studienteilnehmer/\*innen wurden nach dem klinischen Interview gebeten, alle Fragebögen, darunter auch ein Fragebogen zu soziodemographischen Daten, in einem separaten Raum eigenständig auszufüllen.

Die statistische Auswertung der Fragebögen erfolgte pseudonymisiert mit Hilfe des Statistikprogramms SPSS (Version 21). Alle statistischen Berechnungen zur Beantwortung der Fragestellungen wurden ebenfalls von der Doktorandin unter Supervision ihrer Doktormutter Prof. Yesim Erim durchgeführt. Hierzu wurden unter anderem folgende Berechnungen mit dem SPSS durchgeführt: Zur Überprüfung der Gruppenunterschiede (Patient\*innen- vs. Kontrollgruppe) wurde der t-Test für unabhängige Stichprobe durchgeführt. Bei multiplen Tests wurde nach Bonferroni korrigiert. Um die Zusammenhänge zwischen der somatoformen Schmerzstörung und den übrigen Variablen zu untersuchen, wurden Korrelationsanalysen und Regressionsanalysen durchgeführt. Für die Fragestellungen aus der Teilstudie I wurde eine binäre logistische Regressionsanalyse und für die aus der Teilstudie II wurde eine multiple lineare Regressionsanalyse sowie eine Moderationsanalyse durchgeführt. Weitere Informationen über die Studienstichprobe, Datenerhebung sowie die statistischen Berechnungen können aus den zwei Publikationen [47, 48] entnommen werden.



## **5. Ergebnisse**

### **5.1 Soziodemographie und klinische Besonderheiten der Patient\*innenstichprobe**

Das Durchschnittsalter der Patient\*innengruppe lag bei 47.5 Jahren (SD=10.6). In der Patient\*innengruppe waren 69.2% weiblich. Die durchschnittliche Schmerzdauer bei den Patient\*innen lag bei 12.1 Jahren (min. 1 Jahr/max. 28 Jahre; SD=7.8). 87% der Patient\*innen mit einer somatoformen Schmerzstörung wiesen im SKID-Interview zusätzlich eine depressive Symptomatik auf. Darüber hinaus berichteten im SKID-Interview über 50% der untersuchten Patient\*innen von rezidivierenden, depressiven Episoden. Weitere Besonderheiten der Patient\*innengruppe als auch der Kontrollgruppe sind in den Publikationen ausgeführt [47, 48].

### **5.2 Ergebnisse aus der Teilstudie I**

Entsprechend unserer Annahme war in der Patient\*innengruppe die unsichere Bindung überrepräsentiert. 60% der Patient\*innen wiesen einen unsicheren Bindungsstil auf. Dabei war entsprechend der Annahme in der Kontrollgruppe vermehrt (80%) der sichere Bindungsstil zu beobachten. Patient\*innen berichteten zudem vermehrt belastende Kindheitserfahrungen. Insbesondere überschritt die Patient\*innengruppe in den Subskalen emotionale und körperliche Vernachlässigung einen klinisch auffälligen Cut-off-Wert. Ferner gaben Patient\*innen signifikant mehr traumatische Lebensereignisse an als die gesunde Kontrollgruppe. 70% der Patient\*innen gaben drei oder mehr traumatisierende Lebensereignisse an. Im Vergleich berichteten knapp über 50% der gesunden Kontrollen nur über ein oder kein traumatisches Lebensereignis. Ferner war, in Übereinstimmung mit unseren Hypothesen, ein hoher Zusammenhang zwischen dem unsicheren Bindungsstil, depressiven Symptomen, der Anzahl traumatischer Lebensereignisse und der somatoformen Schmerzstörung zu beobachten [47].

### **5.3 Ergebnisse aus der Teilstudie II**

In Übereinstimmung mit unserer Hypothese und dem klinischen Bild der somatoformen Schmerzstörung wies die Patient\*innengruppe eine höhere Zurückweisungsempfindlichkeit im Vergleich zu der gesunden Kontrollgruppe auf. Ferner standen die Faktoren depressive und somatische Symptome, der unsichere Bindungsstil sowie belastende Kindheitserfahrungen, entsprechend unserer Hypothese, in engen Zusammenhang mit der Zurückweisungsempfindlichkeit. Entgegen unserer Annahme hatte das Vorhandensein der somatoformem Schmerzstörung jedoch keinen verstärkenden bzw. moderierenden Effekt auf diesen Zusammenhang [48].

## 6. Bedeutung für das Fach Psychosomatik

Aufgrund der komplexen, multifaktoriellen Ätiologie, der hohen Prävalenz sowie der hohen Inanspruchnahme des Gesundheitssystems ist die somatoforme Schmerzstörung von hoher Relevanz für die Forschung.

Die aktuelle Ätiologieforschung plädiert für ein biopsychosoziales Erklärungsmodell in der Entstehung und Aufrechterhaltung der somatoformen Schmerzstörung, die aus Erkenntnissen der bildgebenden, laborchemischen, psychologischen sowie umweltbezogenen Studien gewonnen wurden [18, 19]. Jede Studie kann zur Klärung einzelner Aspekte des umfangreichen ätiologischen Konzepts einen Beitrag leisten. Mit der vorliegenden, querschnittlichen Arbeit sollte auch zu ätiologischen bzw. aufrechterhaltenden Zusammenhängen ein Beitrag geleistet werden. Denn ein besseres Verständnis der Ätiopathogenese kann das Verständnis für diese Störung erhöhen und die Behandlung/-serfolge verbessern, z.B. durch die Weiterentwicklung bzw. den Ausbau von bereits evidenzbasierten Therapieansätzen wie die der kognitiven Verhaltenstherapie [55].

Aus klinischer Sicht und sicherlich auch aus der Perspektive der Patient\*innen stehen schmerzhafte Symptome der somatoformen Schmerzstörung im Vordergrund, dennoch haben psychologische Faktoren wie Affekt (unter anderem eine Depression), biographische Aspekte (insbesondere belastende, traumatisierende Lebensereignisse, frühkindliche Belastungen/ Traumata) und interaktionelle Schwierigkeiten (vermutlich verursacht oder verstärkt durch hohe Zurückweisungsempfindlichkeit) eine aufrechterhaltende und verstärkende Rolle. Diese sollten auch in der psychotherapeutischen Arbeit Berücksichtigung finden, um die Effektivität der Behandlung zu stärken. In der Behandlung der Symptomatik ist das Entwickeln eines individuellen, biopsychosoziales Erklärungsmodells und eine ausführliche Psychoedukation sehr bedeutsam. Es können aber auch auf Grundlage der vorliegenden Befunde die Berücksichtigung des Bindungsverhaltens des Patienten/ der Patientin in der therapeutischen Beziehung (z.B. durch Gestaltung einer vertrauensvollen Beziehung im Therapiesetting), das Mitbehandeln der Zurückweisungsempfindlichkeit (z.B. durch Ausbau interaktioneller Fähigkeiten, Arbeit an der Wahrnehmung und dessen Interpretation) sowie das Aufarbeiten von belastenden Lebensereignissen die Effektivität der Psychotherapie erhöhen.

Zur Untermauerung vorliegender Ergebnisse sind prospektive Studien erforderlich, um mehr Aufschluss über die Zusammenhänge gewinnen zu können und vorhandene Therapiebausteine zu erweitern.

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## 8. Abkürzungsverzeichnis

CTQ-34= Childhood Trauma Questionnaire (Fragebogen zu Kindheitstraumata)

DSM-4= Diagnostisches und statistisches Manual psychischer Störungen, 4. Auflage

DSM-5= Diagnostisches und statistisches Manual psychischer Störungen, 5. Auflage

ETI= Essener Trauma-Inventar

PHQ-9= Patient Health Questionnaire (Gesundheitsfragebogen, Sektion depressive Symptome)

PHQ-15= Patient Health Questionnaire (Gesundheitsfragebogen, Sektion somatische Symptome)

ICD-10= Internationales Klassifikationssystem psychischer Störungen der Weltgesundheitsorganisation WHO, Version 10

ICD-11= Internationales Klassifikationssystem psychischer Störungen der Weltgesundheitsorganisation WHO, Version 11

M= Mittelwert

N= Stichprobengröße/ Grundanzahl

OR= Odds ratio

RQ= Relationship Questionnaire (Bindungsfragebogen)

RSQ= Rejection Sensitivity Questionnaire (Fragebogen zur Zurückweisungsempfindlichkeit)

SD= Standardabweichung

SKID-I= strukturiertes klinisches Interview I zur Diagnostik psychischer Störungen nach

DSM (Diagnostisches und statistisches Manual psychischer Störungen)

SPSS= Statistical Package for the Social Sciences

## 9. Tabellarische Übersicht der eingesetzten Fragebögen

Fragebogen	Konstrukt	Referenzen
<b>SKID-I</b>  Strukturiertes, Klinisches Interview nach DSM-4 (Diagnostisches und statistisches Manual psychischer Störungen)	Screeningfragen zu psychischen Störungen (allg. Screeningbogen)  Sektion G erfasst die Kriterien für alle somatoforme Störungen  Sektion A erfasst die Kriterien für affektive Störungen	Wittchen et al. (1997). SKID Strukturiertes, Klinisches Interview DSM-IV. Diagnostisches und Statistisches Manual Psychischer Störungen. Hogrefe: Göttingen, German.
<b>PHQ</b>  Patient Health Questionnaire	PHQ-15 zur Erfassung der Ausprägung somatischer Symptome (15 Items)  PHQ-9 zur Erfassung der Ausprägung depressiver Symptome (9 Items)	Löwe et al. (2002). Gesundheitsfragebogen für Patienten (PHQ-D). Komplettversion und Kurzform. 2. Auflage, Pfizer: Karlsruhe, German.
<b>RQ</b>  Relationship Questionnaire	Erfassung des Bindungsstils (30 Items)  Bildet vier Bindungsstile ab	Steffanowski et al. (2001). Psychometrische Überprüfung einer deutschsprachigen Version des Relationship Scales Questionnaire (RSQ). In: Basler M. Störungsspezifische Therapieansätze- Konzepte und Ergebnisse (S.320-342). Gießen: Psychosozial-Verlag.
<b>ETI</b>  Essener Trauma-Inventar	Liste mit 16 potenziellen traumatischen Lebensereignissen und die Beurteilung der Belastung dazu.	Tagay, Senf (2014). Trauma-Inventar. Eine Verfahrensfamilie zur Identifikation von traumatischen Ereignissen und Traumafolgestörungen. 1. Auflage. Hogrefe: Göttingen.
<b>CTQ-34</b>  Childhood Trauma Questionnaire	Erfassung von traumatischen Kindheitserfahrungen (34 Items)  Erfasst fünf Bereiche (sexueller, emotionaler, körperlicher Missbrauch, körperliche und emotionale Vernachlässigung)	Wingenfeld et al. (2010). Die deutsche Version des Childhood Trauma Questionnaire (CTQ): Erste Befunde zu den psychometrischen Kennwerten. Psychother Psychosom Med Psychol. 60 (11):442– 50.
<b>RSQ</b>  Rejection Sensitivity Questionnaire	Erfassung der sozialen Zurückweisungsempfindlichkeit (20 Items)  Zwei Subskalen „die Erwartung einer Ablehnung“ und „Angst vor Ablehnung“	Staebler et al. (2011). Rejection sensitivity and borderline personality disorder. J Clin Psychol. 8:275–328.

## **10. Originalpublikationen**

**Nacak Y**, Morawa E, Tuffner D, Erim Y. Insecure attachment style and cumulative traumatic life events in patients with somatoform pain disorder: A cross-sectional study. *J Psychosom Res.* 2017 12; 103:77-82. doi: 10.1016/j.jpsychores.2017.10.003.

**Nacak Y**, Morawa E, Erim Y. High Rejection Sensitivity in Patients With Somatoform Pain Disorder. *Front Psychiatry.* 2021 3; 29:602981. doi: 10.3389/fpsyt.2021.602981.



# Insecure attachment style and cumulative traumatic life events in patients with somatoform pain disorder: A cross-sectional study



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## ABSTRACT

**Objective:** Current models assume somatoform pain disorder (SPD) to be the result of a complex interaction between bio- and psychosocial factors, but the etiology is still not well understood. This study aimed to investigate the distribution of attachment style and the frequency of traumatic life events, especially childhood adversities, in patients with SPD compared to healthy controls.

**Methods:** We compared 65 patients with SPD (confirmed by Structured Clinical Interview, SCID-I) to 65 age- and gender-matched healthy controls. The following questionnaires were employed: Relationship Scale Questionnaire (RSQ), Essen Trauma Inventory (ETI), Childhood Trauma Questionnaire (CTQ) and Patient Health Questionnaire (PHQ-15). A logistic regression analysis was used to identify the association between SPD and psychological factors.

**Results:** Insecure attachment was significantly more prevalent (60%) in patients with SPD compared to healthy subjects (14%;  $p < 0.001$ ). Overall, 70.4% of patients with SPD reported three or more traumatic events in their life, compared with healthy subjects who reported predominantly one (40%). Patients with SPD scored significantly higher in all CTQ subscales compared to the healthy controls. The factor most strongly related with SPD was the insecure attachment style (OR = 11.20, 95% CI: 1.32–94.86). Other significant predictive factors were depression (OR = 3.35, 95% CI: 1.84–6.11) and number of traumatic events (OR = 2.04, 95% CI: 1.06–3.92). Insecure attachment, depression symptoms and the number of traumatic events explained 86.2% of the variance.

**Conclusions:** The high predictive value of insecure attachment style and cumulative traumatic events emphasize their importance as risk factors of SPD.

## 1. Introduction

Patients who have somatoform pain disorder (SPD) complain of persistent, severe and distressing pain, with the 12-month prevalence rate among the German general population being 8.1% [1]. SPD is defined by the presence of pain which either persists in the absence of a physical condition, or is not fully explained by a medical condition. Psychological factors are central in the onset, severity, exacerbation and maintenance [2]. Current models assume somatoform pain as resulting from a complex interaction between bio- and psychosocial factors [3,4] but the etiology is still not well understood.

There is increasing empirical evidence that an insecure attachment style, traumatic life events, especially early childhood adversities, play an important role in the development, maintenance and progression of mental and functional disorders over the lifetime [5,6]. The same

factors have been investigated in patients with SPD [3].

## 2. Attachment

Attachment theory is a psychological model that describes the dynamics of interpersonal relationships and represents a fundamental aspect of personality development [7]. On the basis of the interaction with primary caregivers during infancy and childhood, children develop a stable and secure internal “working model” of the self and others, which may help them to predict and understand the responses of others and to establish future relationships [7]. Bartholomew and Horowitz [8] identified four main attachment types in adults, which are conceptualized in terms of secure (viewed as healthy and adaptive) and insecure (dismissing, preoccupied and fearful) attachment styles. A secure attachment ensures that the person will be able to manage

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distress and regulate emotions as well as promote adaptive responses to threat throughout the lifespan. An insecure attachment contributes to a dysfunctional regulation of stress and emotion [9] and represents a risk factor for chronic pain.

Numerous studies suggest that there is a high prevalence of insecure attachment among patients with chronic pain [10–14]. Ciechanowski et al. [10] showed an association between insecure attachment and number of reported somatic symptoms. Waller et al. [11] reported insecure attachment to be significantly more frequent in somatoform disorders, including SPD, than in nonclinical controls. Patients with chronic pain have reported an insecure attachment style more often than pain free controls [12] and insecure attachment was found to be highly associated with medically unexplained musculoskeletal pain [13].

In terms of the impact of attachment on pain, Meredith et al. [15] postulated that insecure attachment represents a sensitivity for developing chronic pain and those with insecure attachment are more likely to have a maladaptive response to pain. For example, individuals with an insecure attachment style show a heightened physical pain sensitivity, as well as a reduced pain threshold on experimentally induced pain [16,17].

### 3. Traumatic life events and childhood adversities

Prospective studies could demonstrate an association between chronic pain and lifetime traumatization [5,18]. Reviews have found substantial associations between history of sexual abuse and a lifetime diagnosis of somatoform disorders [6,19]. Brown et al. [20] found that patients with somatization disorder reported more emotional and physical abuse, and had witnessed more violence in their childhood in comparison to patients with a disorder of medical origin. In addition to this, patients with a somatization disorder were found to have suffered significantly more physical and sexual abuse in childhood than patients with a depression [21]. Moreover, psychiatric patients who had experienced traumatization reported more somatoform symptoms [22]. A meta-analysis [23] showed that traumatic events are associated with an increased prevalence of somatic syndromes. Furthermore, traumatized abuse survivors were found to report more chronic pain [24].

The amount of traumatic life events therefore seems to have a high impact on the development of chronic pain [18,25]. In the clinical field, the conditional relationship between traumatization and SPD seems to be manifest and obvious, but there is still insufficient empirical evidence for this. To our knowledge, there is no study that investigates the prevalence of numerous traumatic events in general, as well as different facets of childhood adversities and attachment style, in the same study. Therefore, the purpose of the present study was to follow up previous findings and to gain further insight into the relation between somatoform pain, traumatic life events, maladaptive childhood experiences and insecure attachment, using a well-evaluated patient group in comparison to an age- and gender-matched healthy control group.

We hypothesized that an insecure attachment style would be more frequent in patients with SPD compared to healthy controls.

Secondly, we predicted that patients with SPD would report more traumatic life events and childhood adversities than healthy controls.

Thirdly, we presumed that insecure attachment and traumatic life events, especially childhood adversities, are psychological risk factors that have a predictive impact on development of SPD.

## 4. Methods

### 4.1. Study design and sample

Patients with pain disorders, who have failed previous outpatient medical treatments and psychotherapy in the primary care are admitted to the day clinic of Psychosomatic Medicine and Psychotherapy and/or to the Multidisciplinary Pain Center (MPC) of the Institute of

Anesthesiology. Referrals can be made by physicians, mostly general practitioners, psychiatrists or clinical psychologists. Both centers conduct a comprehensive diagnostic evaluation including medical conditions and mental disorders. The main focus of the MPC is drug treatment; in the psychosomatic day clinic psychotherapeutic methods are used. In the above mentioned units from August 2014 to May 2015 we asked 100 patients with SPD to participate in the study. Of these, 65 patients agreed to participate and were available for analysis (response rate 65%). A further 35 declined participation because of several reasons (no time or interest, logistical reasons, burdening questions). Responders and non-responders did not differ in gender or age. Selection criteria consisted of the diagnosis of “pain disorder associated with psychological factors” according to Code 307.80 of Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) [2], which is also consistent with the International Classification of Diseases criteria [26]. A trained psychologist performed the diagnosis using the Structured Clinical Interview for DSM-IV (Axis I). There were 65 healthy controls who were recruited according to the “snowball” method, as well as through advertisements in the university library, and were matched for sex and gender. General exclusion criteria for both groups were: age younger than 18 or older than 65 years, current alcohol or substance abuse, any major organic or psychotic disorder, as well as insufficient German language skills or any disabilities that impair understanding the study and the questionnaires. All participants gave written informed consent. The study was approved by the local ethic committee of the Friedrich-Alexander University Erlangen-Nürnberg (FAU) (approval number: 46\_14B).

To confirm the patient's diagnostic status concerning somatoform and mood disorders, we used the German version of the Structured Clinical Interview (SCID-I), for Axis-I disorders [27]. For the control group, the short-version of the Structured Clinical Interview for DSM-IV was used for screening to exclude any participants with mental disorders. None of the subjects met the criteria for a current or lifetime somatization or mental disorder. After study inclusion, each participant was invited to take part in the SCID-I and ETI interview, conducted by a trained psychologist. After the interview, participants completed the questionnaires by themselves in a separate room.

## 5. Psychometric instruments

### 5.1. Structured Clinical Interview (SCID-I)

SCID-I [27] is a semi-structured interview for detection of current and lifetime Axis-I diagnoses according to the DSM-IV criteria [2]. We applied the German version of Section G (somatoform disorders) for validation of SPD. On the basis of frequent comorbidity with depression, we also used Section D for mood disorders.

### 5.2. Patient Health Questionnaire (PHQ-15)

The PHQ-15, a module of the Patient Health Questionnaire [28], is a 15 item self-report questionnaire, measuring the severity of somatic symptoms. The items include the most relevant DSM-IV somatic symptoms. The total score ranges from 0 to 30 and represents the severity level of somatization whereby a score of  $\geq 5$  is considered mild,  $\geq 10$  medium, and  $\geq 15$  severe. PHQ-15 is considered to be a reliable and valid instrument for measuring somatic symptom severity [29].

### 5.3. Patient Health Questionnaire (PHQ-9)

Severity of depression symptoms were assessed using the nine item depression subscale PHQ-9 of the Patient Health Questionnaire [28]. Each of the items corresponds to one of the DSM-IV symptoms for major depressive disorder. Subjects were asked for the last two weeks. PHQ-9 score ranges from 0 to 27, with scores of  $\geq 5$  mild,  $\geq 10$  moderate,  $\geq 15$  severe depression severity. Psychometric properties of the PHQ-9 are

well documented [30].

#### 5.4. Relationship Scale Questionnaire (RSQ)

The RSQ [31] is a self-rating instrument to identify the adult attachment dimension. RSQ consists of 30 items scored on a 5-point Likert-scale and yields four attachment subscale scores: secure, preoccupied, fearful and dismissing. The German version of RSQ has well documented psychometric properties [32].

#### 5.5. Childhood Trauma Questionnaire (CTQ)

The CTQ [33] is a well-validated and standardized self-report instrument that measures the severity of five types of childhood adversities (emotional, sexual and physical abuse, emotional and physical neglect). Items are rated on a 5-point Likert-scale with higher scores indicating more severe traumatic experiences. Subscale scores range from 5 to 25 and the total score ranges from 25 to 125. The validated German version [34] was used. Clinically relevant cut-off values for traumatic events are based on Walker et al. [35] (emotional abuse  $\geq 10$ , emotional neglect  $\geq 15$ , sexual abuse  $\geq 8$ , physical neglect  $\geq 8$ , physical abuse  $\geq 8$ ). The German version of CTQ has good psychometric properties [36].

#### 5.6. Essen Trauma-Inventory (ETI)

The ETI [37] is a self-rating questionnaire developed to assess potentially traumatic events and is related to posttraumatic symptomatology according to DSM-IV. We used the trauma inventory as an interview to assess the number of potentially traumatic events (personally experienced or witnessed) and to determine which one bothered them the most. Psychometric properties are well documented [38].

#### 5.7. Statistical analysis

The necessary sample size was calculated with G\*Power Analysis software program. A total of 64 patients would be required for 80% power, assuming a type 1 error rate of alpha 0.05 to detect differences with an effect size of  $d = 0.5$  between patients and healthy controls in terms of mean numbers of traumatic life events.

All analyses were conducted using SPSS v.21.0 (SPSS, Inc., Chicago, USA). Data for descriptive analyses were shown as mean values, standard deviations and percentage values. The Chi-square test was applied for categorical variables. For comparisons between the groups we used the *t*-test for independent samples. An enter model for binary logistic regression analysis was used to test the association between the presence of SPD and psychological factors (attachment style, number of traumatic life events, total score of childhood adversities and depression score). Attachment style was dichotomized as secure vs. insecure. For significant predictors, we report odds ratios (ORs) and 95% confidence intervals (CIs). Two subjects were identified as outliers and were removed from the analysis. In all analyses a significance level of  $p < 0.05$  was predetermined. For alpha adjustment, we used the Bonferroni-Holm correction [39].

### 6. Results

#### 6.1. Socio-demographical characteristics

The age of the patients group ranged from 18 to 65 ( $M = 47.5$ ,  $SD = 10.6$ ). Among these, 45 (69.2%) were female. The age of the healthy controls ranged from 20 to 65 ( $M = 43.9$ ,  $SD = 11.8$ ) and 49 (75.4%) of them were female. 76.9% ( $n = 50$ ) of the patients and 72.3% ( $n = 47$ ) of the healthy controls were in a partnership. There were no significant differences between the two groups with respect to gender, age or partnership. Differences regarding education level and

employment status were observed. Patients with SPD have graduated significantly more from the middle school (58.5%;  $n = 37$ ) in contrast to healthy persons (38.4%;  $n = 25$ ). 35.4% ( $n = 23$ ) of the patients have a university entrance diploma in contrast to 56.9%; of healthy controls ( $n = 37$ ). The mean pain duration in the patients group was 12.1 years ( $SD = 7.8$ ) in a range of 1–28 years. The healthy controls reported no chronic pain.

#### 6.2. Somatic symptoms and depression as comorbidity

Our data showed that patients with SPD have a significantly higher mean value in PHQ-15 ( $M = 12.35$ ,  $SD = 5.4$ ;  $M = 2.41$ ,  $SD = 1.8$ ;  $p < 0.001$ ) and PHQ-9 ( $M = 11.02$ ,  $SD = 6.49$ ;  $M = 1.69$ ,  $SD = 2.26$ ,  $p < 0.001$ ) as compared to the healthy controls. According to the cut-off values, 53.2% of the patients with SPD achieved a total score of 10 or more in PHQ-15 and 52.4% of them achieved a total score of 10 or more in PHQ-9. At the time of the study, 87.3% of the patients with SPD presented a current depressive episode. Moreover, 55.5% were diagnosed with recurrent depressive disorder following the SCID-I interview. None of the healthy controls have depression in SCID-I.

#### 6.3. Attachment

In the patient group, insecure patterns of attachment were clearly more prevalent. A total of 39 (60%) patients were classified as insecure. In the control group, 52 (80%) were classified as having a secure attachment ( $p < 0.001$ ). The distribution of the four categories was divided in 25 secure (38.5%), 9 fearful (13.8%), 12 preoccupied (18.5%), 18 dismissing (27.2%) and 1 missing data in the patients group. The distribution of the healthy control group was as follow: 52 secure (80%), 1 fearful (1.5%), 4 preoccupied (6.2%), 4 dismissing (6.2%) and four missing data.

#### 6.4. Childhood adversities

Patients with SPD scored significantly higher in all CTQ subscales compared to the healthy controls, also after correction of Bonferroni-Holm regarding multiple testing. Compared to healthy controls, patients with SPD also achieved clinical relevant cut-off values in subscales emotional neglect ( $n = 49$ ; 75.4%) and physical neglect ( $n = 37$ ; 56.9%). Controls groups mean values were all below the critical value. The group comparisons are depicted in Table 1.

#### 6.5. Traumatic events

Patients with SPD ( $M = 3.8$ ,  $SD = 1.97$ ) had significantly more traumatic life events than healthy controls ( $M = 1.83$ ,  $SD = 1.97$ ;  $p < 0.001$ ). A total of 43 (70.4%) patients with SPD reported three or more traumatic life events in respect to 16 healthy controls (26.7%). Of

**Table 1**  
Comparison of the mean values of Childhood Trauma Questionnaire (CTQ).

	Patients group (n = 65)	Healthy controls (n = 65)	Statistics
CTQ physical abuse * $\geq 8$	7.47 (4.5)	5.62 (1.8)	0.005
CTQ sexual abuse * $\geq 8$	6.61 (3.9)	5.43 (1.7)	0.039
CTQ emotional abuse * $\geq 10$	9.75 (5.6)	6.74 (1.4)	0.001
CTQ emotional neglect * $\geq 15$	17.94 (5.5)	11.57 (6.6)	0.001
CTQ physical neglect * $\geq 8$	9.68 (4.5)	7.09 (2.9)	0.001
CTQ total score	51.11 (18.3)	37.28 (12.3)	0.001

\* Clinically relevant cut-off values (Walker et al., 1999)/ presence of a neglect or abuse.

**Table 2**  
Types of personally experienced and/or witnessed traumatic events reported by patients and healthy controls (multiple answers possible).

	Patients with somatoform pain disorder (n = 65)	Healthy controls (n = 65)
<b>Interpersonal sexual traumatization</b>		
Sexual assault by a family member	8 (12.7%)	–
Sexual assault by a family member < 18y	5 (7.9%)	–
Sexual assault by a stranger	5 (7.9%)	1 (1.6%)
Sexual assault by a stranger < 18y	12 (19%)	1 (1.6%)
<b>Interpersonal nonsexual traumatization</b>		
Non-sexual assault by family member	17 (27.0%)	2 (3.3%)
Non-sexual assault by stranger	16 (25.4%)	4 (6.7%)
Emotional neglect by parents	20 (31.7%)	2 (3.3%)
<b>Other kind of traumatization</b>		
Accident, fire, or explosion	17 (27.0%)	8 (13.3%)
Natural disaster	3 (4.8%)	10 (16.7%)
Life-impairing illness by one's self	18 (28.6%)	13 (21.7%)
Life-impairing illness of a related person	29 (46.0%)	18 (30.0%)
Death of a related person	47 (74.6%)	28 (46.7%)
Soldier in battle	1 (1.6%)	–
Marital separation	12 (19.0%)	2 (3.3%)
Parental divorce	5 (7.7%)	1 (1.6%)
Other (e. g. mobbing)	16 (25.4%)	9 (15.0%)
<b>Prevalence of trauma</b>		
No trauma	1 (1.6%)	7 (11.7%)
One	5 (8.2%)	24 (40.0%)
Two	12 (19.7%)	13 (21.7%)
Three or more	43 (70.41%)	16 (26.7%)
Missing	4 (6.4%)	5 (7.9%)

the healthy controls, 40% reported just one traumatic event in the past, with 11.7% reporting no traumatic events. The most frequently reported traumatic event in the patient group was death of a related person (74.6%), followed by life-impairing illness of a related person (46%), and emotional neglect by parents (31.7%). At the time of the study, the traumatic event rated as most bothersome in the patients group was death of a related person (26.6%), followed by a life impairing illness of either a related person or of their own (18.8%). The most frequently experienced traumatic event in the healthy control group was death of a related person (46.7%), followed by life-impairing illness of a related person (30%). The traumatic event rated as most bothersome in the control group was also death of a related person (37.7%) followed by life-impairing illness of a related person (18%). Table 2 presents the prevalence of each type of traumatic events.

### 6.6. Multiple binary logistic regression analysis

Compared with healthy persons, patients with SPD were eleven-fold more likely to have an insecure attachment style (OR = 11.20, 95% CI: 1.32–94.86) and more likely to report depression symptoms (OR = 3.35, 95% CI: 1.84–6.11) and traumatic life events (OR = 2.04, 95% CI: 1.06–3.92). Childhood adversities were not significantly associated with higher risk for SPD. Concerning the variance, 86.2% could be explained by insecure attachment, depression symptoms and the number of traumatic events (Table 3).

## 7. Discussion

To the best of our knowledge, this is the first study to assess attachment style, various types of childhood adversities and potential traumatic life events as psychological risk factors for SPD in a single

**Table 3**  
Binary logistic regression model on presence of somatoform pain disorder.

Predictor	B	Wald	OR	95% CI	p
Attachment*	2.416	4.909	11.197	1.322–94.862	0.027
PHQ-9 score	1.209	15.593	3.350	1.838–6.105	0.001
Number of traumatic events	0.712	4.538	2.038	1.059–3.924	0.033
CTQ total score	-0.075	3.295	0.928	0.856 - 1.006	0.069

Hosmer-Lemeshow = 0.979; df = 8; p = 0.998; 2-Log-Likelihood = 37.472; R<sup>2</sup> = 0.862 (Nagelkerke).

OD = odds ratio; CI = confidence interval; B = regression coefficient;

\* Dichotomized: secure (ref.) vs. insecure.

study, using a clinical sample in comparison to healthy controls.

### 7.1. Insecure attachment

In accordance with our expectations, insecure attachment is over-represented in patients with SPD. Our results show that 60 % of the patients with SPD have an insecure attachment style. Previous studies reported similar findings and showed an association between insecure attachment and chronic pain [10–14]. These findings also support Meredith's attachment-diathesis-stress model of chronic pain [15], which emphasizes the strong association between the chronicity of pain and insecure attachment. Meredith [15] concluded that insecure attachment represents a predisposition to developing chronic pain.

In our study of the various insecure subtypes, dismissive attachment was the most frequent, followed by a preoccupied and fearful attachment style. These results are consistent with those reported by Schroeter et al. [13]. In another study [12], preoccupied attachment was most strongly associated with chronic pain. Additionally, in our control group, 80% of the participants were classified as secure, which is in line with previous findings [40–42].

### 7.2. Traumatic life events and childhood adversities

Both patients with SPD and healthy controls most frequently reported the death of a related person as the most bothersome traumatic event, followed by life-impairing illness of a related person or of one's own. Patients with SPD reported these critical life events significantly more frequently than healthy controls. This observation is in accordance with some previous studies [43,44], in particular the finding that maternal loss in childhood is frequent in patients with SPD, which was also found in our study. In comparison to healthy controls, patients with SPD more often reported interpersonal non-sexual traumatic events. The most frequently reported experience was emotional neglect. It appears that emotional neglect in childhood may lead to an insecure attachment, caused by the lack of a close relationship with caregivers. Emotional neglect can also lead to fixation of amplified (somatosensory) body signals [45].

In analyzing the different subclasses of childhood adversities (CTQ), patients with SPD exceeded the clinical cut-off values in emotional and physical neglect. Surprisingly, patients with SPD did not achieve the clinically relevant cut-off values in physical or sexual abuse or neglect. However, the frequency in the ETI, where 19% of the patients with SPD reported sexual assault when they were under 18 years, is consistent with previous literature [18,24,44,46]. Not all previous findings report an association between sexual abuse and chronic pain [47,48]. Our patients reported more frequently non-sexual traumatic events like emotional neglect by their parents. Furthermore, it may be easier for patients to report emotional neglect rather than sexual or physical abuse, which is socially frowned upon.

### 7.3. Cumulative effect of traumatic life events

In accordance with our expectations, patients with SPD reported an unusually high number of traumatic life events compared to healthy controls, regardless of the type of the trauma. Patients reported three or more traumatic life events in respect to controls, who predominantly reported only one single traumatic event in their life. Our results support previous findings that traumatic events have a cumulative effect on psychological as well as on physical well-being. Moreover, there are several studies supporting the cumulative effect of trauma on the occurrence and development of physical conditions [25,49,50].

### 7.4. Psychological risk factors

More than 86% of the variance was explained by insecure attachment, symptoms of depression and frequency of traumatic events. Participants with an insecure attachment were found to be eleven times more likely to suffer from SPD. This finding is in line with previous studies showing an increased risk of development of SPD in the presence of insecure attachment [12,15]. A recent study emphasized insecure attachment as an important vulnerability factor [51].

A cumulation of traumatic experiences during childhood and adolescence may lead to the development of chronic pain. Hence, our results emphasize the importance of the frequency of traumatic events and not the type of an adverse life event, as predictors of SPD. This finding deviates largely from most of the previous studies who emphasize early childhood adversities, especially sexual abuse and therefore needs verification by further studies.

Furthermore, the positive association between symptoms of depression and somatoform pain underlined the presence of potential comorbid disorders. In our study, 87.3% of the patients showed a comorbid depression according to SCID-I. This finding confirms the high prevalence of depressive disorders in somatoform pain patients as reported in a recent study [52].

### 7.5. Strengths and limitations

The primary strength of our study is that we employed a structured interview that is accepted as the gold standard to determine diagnosis. The sufficient sample size according to the power analysis has been included in the survey. We also have a patient group with a mean pain duration of 12 years, which represents a strong chronicity of pain. In contrast to most of the previous studies we recruited a control group of similar age and gender distribution, which allows us to better discriminate the specifics of the patient group. We employed two specific trauma lists allowing to characterize specific traumatic experiences.

Our study also has same limitations. First, the cross-sectional design which establishes associations but cannot determine causality. Additionally, retrospective reporting of childhood adversities raises concerns about accuracy of recall. Overestimation or underestimation of traumatic experiences cannot be excluded. Furthermore, we had no exact information about the severity of lifetime adversities, when they occurred or how long they lasted.

Almost all of our patients with SPD have a current depressive disorder, therefore, the interaction between depression and SPD needs further analysis. Our findings are based on a comparison with a healthy control group. Further research needs a comparison group which also suffers from a mental or similar disorder and allows to differentiate more specific features. Finally, we examined a selected patients group with high chronicity and symptom load which searched treatment in our clinic. It may be also interesting to investigate patients in the primary care setting.

## 8. Conclusion

Prospective studies are needed to shed more light on the etiology of

SPD. A better understanding of the risk factors would foster better prevention of SPD and better identification of patients with this diagnostic entity. On the other hand, improving our knowledge on the etiology may help researchers in designing theory guided psychotherapy interventions.

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# High Rejection Sensitivity in Patients With Somatoform Pain Disorder

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**Objective:** Rejection sensitivity (RS) is often associated with mental disorders but as yet has not been investigated in patients with somatoform pain disorder (SPD). The aim of the study was to explore the degree of RS in patients with SPD compared to healthy controls. In addition, we examined factors associated with RS and the moderator effect of SPD.

**Methods:** A total of 65 patients with SPD (confirmed by Structured Clinical Interview, SCID-I) and 65 age- and gender-matched healthy controls participated. Rejection Sensitivity Questionnaire (RSQ), Patient Health Questionnaire (PHQ-9, PHQ-15), Relationship Scale (ReSQ), Essen Trauma Inventory (ETI) and the Childhood Trauma Questionnaire (CTQ) were applied. Multiple linear regression analysis was performed.

**Results:** The level of RS was significantly higher in patients with SPD compared to healthy controls ( $M = 10.30$ ,  $SD = 5.64$ ;  $M = 6.13$ ,  $SD = 2.50$ ;  $p < 0.001$ ;  $d = 0.95$ ). Higher levels of depressive symptoms ( $p < 0.001$ ), childhood adversities ( $p < 0.001$ ) and the insecure attachment style ( $p = 0.007$ ) were related to higher levels of RS. No significant moderation effect was detected.

**Conclusions:** Patients with SPD are highly sensitive to social rejection. In addition, insecure attachment styles as well as depressive symptoms and childhood adversities are strongly associated with RS. Further studies are needed to figure out how RS is connected to SPD over lifetime.

**Keywords:** attachment, chronic pain, childhood adversities, adverse life events, rejection sensitivity, somatoform (pain) disorder

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## HIGHLIGHTS

- Patients with somatoform pain disorder are highly sensitive to social rejection in comparison with healthy controls. Depression, childhood adversities and insecure attachment are strongly associated with rejection sensitivity.

## INTRODUCTION

Somatoform pain disorder (SPD) is defined by the presence of pain that either persists in the absence of a physical condition or is not fully explained by a medical condition. Psychological factors are central in the onset, severity, exacerbation and maintenance of SPD, according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (1). The recent edition (DSM-5) introduced somatic symptom disorder (SSD) as a single diagnostic entity that replaces

SPD and other somatoform disorders and no longer differentiates between medically unexplained or explained symptoms. Diagnostic criteria of SSD also included intensive thoughts, emotions, and behaviors in relation to the illness (2). In a nationally representative survey of the German general population, a 12-month prevalence rate of 3.2% has been found for SPD (3). Current models assume somatoform pain results from a complex interaction between bio- and psychosocial factors (4, 5) but the associated etiology and maintenance are still poorly understood. Therefore, it is necessary to identify associated factors for better understanding and future interventions.

## Rejection Sensitivity (RS)

The feeling of belonging is a fundamental human need to form and maintain secure and stable relationships (6). Social pain interferes with this human basic need and describes hurtful experiences as a result of interpersonal or social distress such as lovesickness, partners breaking up, bullying, ostracism, loss of a loved one, isolation, loneliness or rejection (7). The anticipation of rejection and increased distress when experiencing rejection has been defined in the literature of social psychology as Rejection Sensitivity (RS). RS is a cognitive-affective processing disposition of anxious expectation, readily having a perception and intense reaction to cues of rejection (8). Persons with high levels of RS perceive potential signs of social rejection more readily and interpret ambiguous signs as negative.

Concerning the clinical picture, patients with SPD often report a lack of understanding and helplessness among related persons or medical doctors, which leads them to feel rejected. Sometimes, even medical support or failure in the medical treatment would be perceived by patients as a form of rejection. This shows that patients with SPD are highly sensitive and distressed in social situations and also anticipate that they will be rejected by others (9, 10). Current research findings suggest similar factors and mechanisms are involved in the onset and maintenance of physical and social pain. For instance, the “pain overlap theory” of Eisenberger and Lieberman (11) postulates that a greater sensitivity to one type of pain might accompany a greater sensitivity to the other type of pain. Numerous neuroimaging studies have shown that experimentally induced physical and social pain experiences in a laboratory task share the same neurobiological pathways (12–14). This indicates that if someone suffers from chronic pain over the span of years, it might be assumed that they will be sensitive to the other kind of pain and vice versa. These findings suggest a strong link between SPD and social pain.

## Etiology of Rejection Sensitivity

The onset of a high RS seems to come from early childhood. Early and repetitive experiences of social pain like emotional neglect or abuse by primary caregivers may influence the development of

RS (8). Downey and Feldmann (8) postulated that a high RS is a result of persistent and maladaptive experiences in childhood. Rosenbach and Renneberg (15) postulated that experiences of rejection in childhood and youth are considered a significant factor for being highly sensitive to rejection in later life. One recent study postulates also family and parenting factors, such as family conflict or maternal harshness, as predictive for RS (16). High RS seems to be strongly associated with the lack of secure attachment. Based on the interaction with primary caregivers during infancy and childhood, children develop a stable and secure internal “working model” of the self and others, which helps to predict and understand the responses of others and to establish future relationships (17). A secure attachment ensures the ability to manage distress and regulation of emotions, which have a protective effect on mental health and being related less to RS. However, an insecure attachment contributes dysfunctional regulation of stress and emotion (18) and may promote vulnerability to RS. In accordance with this, individuals with an insecure attachment style are more likely to report persistent perceived social pain, especially fearful attached individuals (19). Another study showed that insecure (fearful) attached students have higher RS values than secure attached students (20). In sum, these results provide support to the finding that insecurely attached individuals are more prone to feelings of social pain.

## Associations Between Rejection Sensitivity and Mental Disorders

Severe or repeated experiences of social pain or rejection may elicit a negative view of the self and higher sensitivity in social situations, which is often associated with mental health problems. A study on patients with borderline personality disorder (BPD) reported higher levels of RS in comparison with healthy controls and postulated that RS is a core component in BPD (21). One recent review (22) also displays disturbances in RS across different personality disorders. Numerous studies have identified high levels of RS and hypervigilance for signs of rejection as predictors for depression (23–25). Results of a previous meta-analysis provide evidence for the association between RS and mental disorders, such as depression, anxiety, borderline personality disorder and eating and bodydysmorphic disorder (26). However, the association between RS and mental health problems seems to be bidirectional.

RS may elicit mental health problems and vice versa. Mental disorders also lead to being more sensitive in social situations. This may also provoke rejection sensitivity. In sum, current findings indicate that RS may play an important role in mental disorders. However, no study has explored the association between RS and somatoform pain. A few studies have already shown that patients with SPD have problems in the interpretation of social signs, deficits in Theory of Mind (ToM) and emotional awareness (27–29). Therefore, the focus of the present study was to investigate the role of RS in patients with SPD, compared to a healthy control group. Clarifying this hypothesis is important for the identification of potential targets for future treatment and prevention efforts. Based on previous findings, we aimed to

**Abbreviations:** SPD, Somatoform Pain Disorder; SSD, Somatic Symptom Disorder; RS, Rejection Sensitivity; SCID-I, Structured Clinical Interview for axis-I disorder; DSM, Diagnostic and Statistical Manual of Mental Disorders; RSQ, Rejection Sensitivity Questionnaire; ReSQ, Relationship Scale Questionnaire; CTQ, Childhood Trauma Questionnaire; ETI, Essen Trauma Inventory; PHQ, Patient Health Questionnaire.

investigate the association between insecure attachment and high RS. We also aimed to investigate whether socio-demographic and other factors are linked to RS. In addition, we also examined whether the presence of SPD moderates the relationship between depressive symptoms, traumatic experiences and RS.

The following hypotheses were tested:

- We hypothesized that patients with SPD display higher RS levels than healthy controls.
- We presumed that insecure attachment, depressive symptoms, childhood adversities, the presence of SPD, the number of experienced traumatic events and socio-demographic factors are associated with RS.
- We postulated a moderation effect of SPD: the presence of SPD would strengthen the relationship between depressive symptoms, attachment style, traumatic experiences and RS.
- In addition, we assumed that insecure-attached persons will have higher RS levels than secure-attached persons, irrespective of being patients or healthy controls.

## METHODS

### Study Design and Procedure

Patients with pain disorders who have failed previous outpatient medical treatments and psychotherapy in primary care are admitted to the day clinic of Psychosomatic Medicine and/or to the Multidisciplinary Pain Center (MPC) of the Institute of Anesthesiology. In the abovementioned units from August 2014 to May 2015, we asked 100 patients with SPD to participate in the study. Of these, 65 patients agreed to participate and were available for analysis (response rate 65%). A further 35 declined participation because of several reasons (no time or interest, logistical reasons and burdening questions). Non-responders did not differ in gender proportion (21 female: 60%;  $p = 0.073$ ) or age ( $M = 46.4$ ;  $SD = 15.13$ , min 22y, max 65y;  $p = 0.065$ ). We recruited 65 age- and gender-matched healthy controls through advertisements in the university library (info boards), and we also asked participants to invite additional people who could meet the participation criteria. For matching the age, we recruited a similar number of participants from the age classes, which we have defined before. General exclusion criteria for both groups were people younger than 18 years of age or older than 65 years. Further exclusion criteria were current alcohol or substance abuse, any major organic or psychotic disorder, people who had insufficient German language skills or those with any disabilities that impaired understanding of the study and questionnaires. All participants gave written informed consent. After the study inclusion, all participants were invited to take part in the Structured Clinical Interview for Axis I disorders (SCID-I for DSM-IV) (30), conducted by a trained psychologist. Inclusion criteria for the patient groups consisted of the diagnosis of “pain disorder associated with psychological factors” according to Code 307.80 of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (1), which is consistent with the International Classification of Diseases criteria (ICD-10) (31). For the control group, the

initial screening questionnaire (with twelve items) of the SCID-I was performed. None of the controls met the criteria for a current or lifetime disorder. After the interview, all participants completed the questionnaires by themselves in a separate room (only the list of potentially traumatic life events was performed as an interview by the same psychologist, immediately after the SCID). The local ethics committee of the Friedrich-Alexander-University Erlangen-Nürnberg (FAU) approved the study (approval number: 46\_14B). Non-overlapping findings of the obtained data have already been used for our previous publication (32).

## Measures

### Rejection Sensitivity Questionnaire (RSQ)

The RSQ (8) was used to assess RS, which measures two components (expectations and anxiety) in 20 hypothetical situations, in which an individual is susceptible to rejection by an important other. The cognitive component of RS (rejection expectancy) is assessed by rating on a six-point Likert scale how strongly the person expects a response of either acceptance or rejection from others (1 = very unlikely; 6 = very likely). The affective component (rejection anxiety) is assessed on a 6-point Likert scale by how anxious or concerned the subject would be regarding this response (1 = very unconcerned; 6 = very concerned). Scoring total score was for each situation (item) by multiplying the level of rejection anxiety by the reverse of the level of rejection expectancy and then averaging the resultant values across the 20 scenarios. The mean scores for anxiety and expectation for rejection are ranged from 1 to 6, and the total score is ranged from 1 to 36. Higher scores reflect greater sensitivity to rejection. RSQ was adapted for application in clinical and non-clinical samples. In this study, we used an adapted 20-item German version of RSQ with well-documented internal consistency ( $\alpha = 0.88$ ) (33). Cronbach's alpha in the present study was 0.94 for the total score (for the subscales anxiety  $\alpha = 0.93$ ; expectations  $\alpha = 0.92$ ).

### Relationship Scale Questionnaire (ReSQ)

The ReSQ (34) is a self-rating instrument to identify the adult attachment style. ReSQ consists of 30 items scored on a five-point Likert-scale and yields four attachment subscale scores: secure, preoccupied, fearful and dismissing attachment. The “secure” attachment indicated that the individuals have a positive view of themselves and others. The “preoccupied” attachment is defined by a negative view of the self and a positive view of others. The “fearful” attachment is defined by a negative view of self and others. The “dismissing” attachment style is described by a positive view of self and a negative view of others. The scores of subscales are obtained by calculating the mean score of the related items. For dichotomizing attachment style, we have summarized the subscales preoccupied, fearful and dismissing attachment as insecure attachment. The German version of ReSQ has well-documented psychometric properties (35). In our study, Cronbach's alpha was 0.79 for the total score.

### Childhood Trauma Questionnaire (CTQ)

The CTQ (36) is a standardized self-report instrument that measures retrospectively the severity of five types of childhood adversities (emotional, sexual and physical abuse, emotional and physical neglect). We used the validated German version (37). Items are rated on a five-point Likert-scale with higher scores indicating more severe traumatic experiences. Subscale scores range from 5 to 25, and the total score ranged from 25 to 125. The German version of CTQ has good psychometric properties (38). In our study, the internal consistency for the total score was 77.

### Essen Trauma Inventory (ETI)

The ETI (39) is a self-rating questionnaire that contains a list of 15 potentially traumatic events (personally experienced or witnessed) and items concerning the objective and subjective threat of life and symptoms on the subscales intrusion, hyperarousal, avoidance and dissociation. Clinically relevant symptomatology according to DSM-IV is indicated by the presence of one traumatic event, objective and subjective threat to life and also achieving a cut off  $\geq 27$  points for the total sum score of the subscales intrusion, hyperarousal and avoidance. In the present study, ETI was conducted as an interview to assess the number of potentially traumatic events. For ETI good psychometric properties have been demonstrated (40).

### Patient Health Questionnaire (PHQ)

The severity of somatic symptoms was assessed using PHQ-15, a 15-item subscale of the German PHQ (41). The items include the most relevant DSM-IV somatic symptoms. The PHQ-15 score ranges from 1 to 30. The severity of depressive symptoms was evaluated with the subscale PHQ-9. Each of the nine items corresponds to one of the DSM-IV symptoms for major depressive disorder. The PHQ-9 score ranges from 0 to 27. Both PHQ-15 and PHQ-9 scores represent the severity level whereby a score of  $\geq 5$  is considered mild,  $\geq 10$  medium, and  $\geq 15$  severe. Psychometric properties of both subscales are well-documented (42, 43). For the present study, Cronbach's alpha for PHQ-15 was 0.88 and for PHQ-9.93.

### Structured Clinical Interview (SCID-I)

SCID-I (30) is a semi-structured interview for detection of current and lifetime Axis-I diagnoses according to the DSM-IV criteria (1). The German version of Section G (somatoform disorders) was applied for validation of SPD. Due to the frequent comorbidity with depression, we also used Section D for mood disorders.

### Statistical Analysis

The necessary sample size was calculated with G\*Power Analysis software program. A total of 64 patients would be required for 80% power, assuming a type one error rate of alpha 0.05 to detect differences with an effect size of  $d = 0.5$  between patients and healthy controls. All analyses were conducted using SPSS v. 24.0 (SPSS, Inc., Chicago, USA). Prior to analyses, the data were checked for normal distribution using statistical and visual methods. The Shapiro-Wilk test was significant, but normal distribution can be assumed by the central limit theorem. Also, visual plots (regression of standardized residuals) showed no

signs of violation of normality assumption. Missing items in PHQ-9 and PHQ-15 were replaced by the mean of the fulfilled items. Missing items in RSQ, ReSQ and CTQ were replaced by the mean of the fulfilled items respective to the subscale. Patients with more than 20% missing values in one of the self-report questionnaires were excluded from the related analysis. Data for descriptive analyses were shown as mean values, standard deviations, frequencies and percentage values. The Chi-square test was applied for categorical variables. For comparisons between the groups, we used the *t*-test for independent samples. For multiple comparisons (mean scores of RSQ), we used the Bonferroni correction for alpha adjustment (44). We also calculated Cohen's *d* for estimating the effect size. Multiple regression analysis (through using the enter method) was performed for the total sample. In the first step, we investigated the association between attachment style (dichotomized; secure = 0, insecure = 1), number of traumatic events, childhood adversities, depressive symptoms, presence of SPD (patient = 0; healthy controls = 1), sociodemographic characteristics age, gender (male = 0; female = 1), education (converted up to middle school into "low" = 0 and university entrance diploma into "high" = 1) and RS (criterion variable). To test whether the presence of SPD moderates the association between depressive symptoms, attachment style, childhood adversities and RS, we added three interaction terms (SPD\* PHQ-9; SPD\* ReSQ; SPD\* CTQ) to the regression model in a subsequent step. Prior to the regression analysis, appropriate assumptions were tested. Before testing the moderation effects, all metric variables were mean centered. Correlation analyses among the variables were calculated to test multicollinearity (by inspection of a pairwise correlation matrix). If correlation coefficients between two variables were higher than 0.70 (45), one of the variables was excluded from the regression model. In all analyses, a significance level of  $p < 0.05$  was predetermined. For the patient group, a separate correlation analysis was calculated for pain duration (in years) and RS.

## RESULTS

### Socio-Demographical and Clinical Characteristics

There were no significant differences between the two groups with respect to gender, age, partnership status, professional training, or nationality. Differences regarding education level and employment status were observed. Scores and statistical values are presented in **Table 1**.

The mean pain duration in the patient group was 12.1 years in a range of 1–28 years ( $SD = 7.8$ ). The healthy controls reported no acute or chronic pain. In the SCID-interview, all of the patients met the criteria of SPD. Furthermore, 87% of the patients with SPD presented a current depressive episode. Moreover, 55.5% were diagnosed with recurrent depressive disorder following the SCID-I interview.

### Rejection Sensitivity in the Study Groups

Compared to healthy controls, patients with SPD showed a higher RSQ total score ( $M = 10.30$ ,  $SD = 5.64$ ;  $M = 6.13$ ,  $SD = 2.50$ ;  $p < 0.001$ ). Patients were significantly more anxious about

**TABLE 1** | Comparison of demographic characteristics between patients and healthy controls.

	Patients with somatoform pain disorder (n = 65)	Healthy controls (n = 65)	Statistics
<b>Age (years)</b>			
Mean (SD)	47.5 (10.6)	43.9 (11.8)	n.s <sup>a</sup>
Range	18–65	20–65	
<b>Gender</b>			
Female	45 (69.2%)	49 (75.4%)	n.s <sup>b</sup>
Male	20 (30.8%)	16 (24.6%)	
<b>Partnership</b>			
Yes	50 (76.9%)	47 (72.3%)	n.s <sup>b</sup>
No	14 (21.5%)	18 (27.7%)	
Not reported	1 (1.5%)	–	
<b>Level of education</b>			
Without certificate	2 (3.1%)	–	0.003** b
Middle school	37 (58.5%)	25 (38.4%)	
University-entrance diploma	23 (35.4%)	37 (56.9%)	
Other	1 (1.5%)	2 (3.1%)	
Not reported	1 (1.5%)	1 (1.5%)	
<b>Professional training</b>			
Without graduate degree	5 (7.7%)	1 (1.5%)	n.s <sup>b</sup>
Apprenticeship	41 (63.1%)	36 (55.4%)	
University diploma	16 (24.6%)	26 (40.0%)	
Other	2 (3.1%)	2 (3.1%)	
Not reported	1 (1.5%)	–	
<b>Employment status</b>			
Currently employed	36 (55.4%)	43 (81.6%)	0.001*** b
Retired	11 (16.9%)	1 (1.5%)	
On sick leave	15 (23.1%)	–	
Other	1 (1.5%)	9 (13.8%)	
Not reported	2 (3.1%)	–	
<b>Nationality</b>			
German	60 (92.3%)	63 (96.9%)	n.s <sup>b</sup>
Others	3 (4.6%)	2 (3.1%)	
Not reported	2 (3.1%)	–	

\*\*\* $p \leq 0.001$ ; \*\* $p \leq 0.01$ ; <sup>a</sup>t-test; <sup>b</sup>Chi-square test.

rejection ( $M = 3.46$ ,  $SD = 1.04$ ;  $M = 2.86$ ,  $SD = 0.083$ ;  $p < 0.001$ ) and rated the likelihood of being rejected higher than healthy controls ( $M = 2.84$ ,  $SD = 0.80$ ;  $M = 2.11$ ,  $SD = 0.50$ ;  $p < 0.001$ ). Insecure attached individuals, regardless of patients or healthy controls, also showed also higher RSQ total score in comparison to secure attached individuals ( $M = 11.83$ ,  $SD = 5.79$ ;  $M = 6.26$ ,  $SD = 2.67$ ;  $p = 0.006$ ). Insecure attached individuals also obtained significantly higher values in the subscales RSQ anxiety ( $M = 3.80$ ,  $SD = 0.92$ ;  $M = 2.82$ ,  $M = 0.85$ ) and RSQ expectation ( $M = 3.01$ ,  $SD = 0.82$ ;  $M = 2.19$ ,  $SD = 0.58$ ) when compared with secure-attached individuals. The effect size was medium to high. Mean scores of RS and statistical values are depicted in **Table 2**.

## Correlations Between Rejection Sensitivity and the Variables of Interest

Two variables showed a correlation coefficient  $> 0.70$  (somatic and depressive symptoms) among each other. Based on statistical criteria (correlation coefficients higher than 0.70) (45) somatic symptoms (PHQ-15) were excluded from the analysis. We decided to exclude PHQ-15 from the analysis because somatic symptoms were already represented by the presence of SPD. In addition, including depressive symptoms (PHQ-9) in the analysis was relevant due to frequent comorbidity with SPD. High significant correlations between childhood adversities, the number of traumatic life events, depressive symptoms, and RS total score were observed. Pearson's correlation coefficients are presented in **Table 3**. No significant correlation between RS total score and pain duration for the patient group was observed.

## Multiple Regression Analysis and Moderation Effects

For exploring the association between RS and attachment, childhood adversities, number of traumatic experiences, depressive symptoms, presence of SPD and sociodemographic variables (gender, age and education) and the moderation effect of SPD, multiple linear regression analysis was performed for the total sample. The first model explained 63.2% ( $R^2$  adj = 0.602,  $F = 21.07$ ;  $p < 0.001$ ) of the variance regarding RS with depressive symptoms ( $\beta = 0.547$ ;  $p < 0.001$ ), childhood adversities ( $\beta = 0.314$ ;  $p < 0.001$ ) and (insecure) attachment style ( $\beta = 0.217$ ;  $p = 0.007$ ) as significant predictors (**Table 4**). Higher levels of depressive symptomatology, more childhood adversities and insecure attachment style were associated with higher RS levels. Based on the second model with the presence of SPD as a moderation variable ( $R^2 = 0.645$ ;  $R^2$  adj = 0.604;  $F = 15.692$ ;  $p < 0.001$ ), SPD did not moderate the relationship between depression, attachment style, childhood adversities and RS. The main effects of depressive symptoms, insecure attachment and childhood adversities remained in the model and showed a significant contribution (**Table 4**).

## DISCUSSION

To our best knowledge, this is the first study that examined RS in the context of SPD, using a clinical sample in comparison to healthy controls.

### High Rejection Sensitivity in Patients With Somatoform Pain and Insecure Attached Individuals

We investigated the level of RS in patients with SPD in contrast to healthy controls. In concordance with our hypothesis and clinical picture of SPD, patients with SPD demonstrated higher scores for RS than healthy controls. They were more anxious about rejection and also rated the likelihood of being rejected higher than healthy controls. These results are in line with a previous meta-analytic study, which estimated an association between RS and other mental health problems (26). Our results also support the pain overlap theory (12–14) which postulates that physical

**TABLE 2 |** Comparison of the mean scores of Rejection Sensitivity Questionnaire (RSQ).

	Patients group (A)	Healthy controls (B)	Total sample of insecure attached (C)	Total sample of secure attached (D)	Statistics <i>p</i> -value; <i>t</i> -value; effect size
<b>RSQ anxiety</b>					
M (SD)	3.46 (1.04)	2.86 (0.83)	3.80 (0.92)	2.82 (0.85)	A > B***; <i>t</i> = 3.54; <i>d</i> = 0.65 C > D***; <i>t</i> = -5.97; <i>d</i> = 1.11
<b>RSQ expectance</b>					
M (SD)	2.84 (0.80)	2.11 (0.50)	3.01 (0.82)	2.19 (0.54)	A > B***; <i>t</i> = 6.01; <i>d</i> = 1.11 C > D***; <i>t</i> = -6.61; <i>d</i> = 1.25
<b>RSQ total</b>					
M (SD)	10.30 (5.64)	6.13 (2.50)	11.83 (5.79)	6.27 (2.62)	A > B***; <i>t</i> = 5.16; <i>d</i> = 0.95 C > D***; <i>t</i> = -7.18; <i>d</i> = 1.35

\*\*\* *p* ≤ 0.001 (after Bonferroni-adjustment; *p* ≤ 0.008); M, mean; SD, standard deviation; *d*, Cohen's effect size; (A): *n* = 64; (B): *n* = 61; (C): *n* = 77; (D): *n* = 48.

**TABLE 3 |** Correlation coefficients between Rejection Sensitivity Questionnaire and variables of interest.

Variables	A	B	C	D	E	F
<b>A</b> Rejection Sensitivity (RSQ)	1	0.608***	0.394***	0.677***	0.561***	0.053
<b>B</b> Childhood adversities (CTQ)		1	0.556***	0.612***	0.482**	0.282**
<b>C</b> Traumatic life events (ETI)			1	0.574***	0.508***	0.331***
<b>D</b> Depressive symptoms (PHQ-9)				1	0.767***	0.152
<b>E</b> Somatic symptoms (PHQ-15)					1	0.210*
<b>F</b> Age						1

\* *p* ≤ 0.05; \*\* *p* ≤ 0.01; \*\*\* *p* ≤ 0.001 (two-tailed); Pearson correlations were conducted; RSQ, Rejection Sensitivity Questionnaire (total score); PHQ-9, Patients Health Questionnaire (depressive symptoms); PHQ-15, Patients Health Questionnaire (somatic symptoms); CTQ, Childhood Trauma Questionnaire; ETI, Essen Trauma Inventory (number of traumatic events), *n* = 112–128 (varying sample size).

**TABLE 4 |** Multiple regression analysis predicting rejection sensitivity.

Independent variables	Model 1 with the main variables						Model 2 with the moderation effect of presence of SPD					
	B <sup>a</sup>	SE <sup>b</sup>	β	t	p	VIF <sup>c</sup>	B <sup>a</sup>	SE <sup>b</sup>	β	t	p	VIF <sup>c</sup>
	<b>R<sup>2</sup> = 0.632 (R<sup>2</sup>adj. = 0.602)</b>						<b>R<sup>2</sup> = 0.645 (R<sup>2</sup>adj. = 0.604)</b>					
Constant	5.720	2.032		2.814	0.006**		5.363	2.504		2.142	0.035*	
Depressive symptoms (A)	<b>0.418</b>	<b>0.079</b>	<b>0.547</b>	<b>5.296</b>	<b>0.001***</b>	2.844	<b>0.405</b>	<b>0.082</b>	<b>0.530</b>	<b>4.947</b>	<b>0.001***</b>	3.072
Childhood adversities (B)	<b>0.095</b>	<b>0.026</b>	<b>0.314</b>	<b>3.708</b>	<b>0.001***</b>	1.913	<b>0.113</b>	<b>0.031</b>	<b>0.373</b>	<b>3.601</b>	<b>0.001***</b>	2.865
Attachment style (C)	<b>2.284</b>	<b>0.826</b>	<b>0.217</b>	<b>2.764</b>	<b>0.007**</b>	1.644	<b>2.742</b>	<b>0.994</b>	<b>0.261</b>	<b>2.758</b>	<b>0.007**</b>	2.391
Presence of SPD (D)	1.405	0.937	0.138	1.499	0.137	2.258	-0.032	1.915	-0.193	-0.017	0.987	9.467
Number of traumatic events (E)	-0.219	0.223	-0.085	-0.985	0.327	1.979	-0.242	0.226	-0.094	-1.071	0.287	2.045
Education	-1.202	0.682	-0.118	-1.763	0.081	1.194	-1.213	0.687	-0.119	-1.766	0.081	1.218
Age	-0.032	0.031	-0.069	-1.027	0.307	1.221	-0.029	0.031	-0.064	-0.945	0.347	1.230
Gender	-0.458	0.723	-0.040	-0.633	0.528	1.064	-0.654	0.735	-0.057	-0.890	0.375	1.102
Interaction term (D) x (A)							-0.311	0.358	-0.072	-0.868	0.388	10.173
Interaction term (D) x (B)							-0.040	0.050	-0.073	-0.789	0.432	2.301
Interaction term (D) x (C)							-1.295	1.747	-0.059	-0.741	0.461	1.670

<sup>a</sup>Regression coefficient; <sup>b</sup>Standard error; <sup>c</sup>Variance inflation factor; (A) Patients Health Questionnaire (PHQ-9); (B) Childhood Adversities Questionnaire (CTQ, total score); (C) Relationship Scale Questionnaire (ReSQ, 0: secure, 1: insecure); (D) 0: patient; 1: controls; (E) Essen Trauma Inventory (ETI); education = 0: "low" (up to middle school); 1: "high" (university diploma); gender (0: male, 1: female); Durbin Watson Statistic: 2.068, significant predictors are marked in bold; \*\*\**p* < 0.001; \*\**p* < 0.01; *n* = 107. Significant predictors are marked in bold.

and social pain have similar underlying factors. In this study, patients showed greater sensitivity to RS, which is in concordance with the clinical picture of SPD. Prior studies have already

shown that patients with SPD have difficulties in interpretation of social signs or emotional awareness (27–29). One possible explanation for the high levels of RS in patients with SPD could

be the history of negative childhood adversities, which was also shown as etiological factors for RS in past research (8, 15, 16). We also compared RSQ scores between groups of secure- and insecure-attached individuals, regardless of the presence of SPD. In this comparison, insecure-attached individuals scored also higher in RS than securely attached. They were significantly more anxious about rejection and estimated the likelihood of being rejected as higher. This suggests that the attachment style is a broader underlying factor for RS, regardless of a mental disorder, which has been already shown in earlier studies [f.e. (46)]. Sato et al. (46) have demonstrated that individuals with high levels of RS are more likely to be insecurely (anxiety) attached. The lack of a secure attachment seems to impair not only mental health but also the sensitivity of interpretation of socially ambiguous situations. Insecure attachments seem like an overlapping factor for both SPD and RS.

### Significant Association Between Rejection Sensitivity, Depression, Attachment, and Childhood Adversities

We assumed that depressive and somatic symptoms, insecure attachment style, childhood adversities and a number of traumatic experiences would have a strong association with RS. Our findings are consistent with our expectations. More than 60% of the variance was explained by depressive symptoms, childhood adversities and insecure attachment. This is in line with previous research [f.e. (8, 16, 19)]. One possible explanation may be that persons with depressive symptoms, like negative attribution and thoughts, may be more anxious about social rejection and more sensitive to cues of rejection. Furthermore, we assume that some depressive symptoms like difficulties in social interactions and withdrawal can provoke rejection and negative responses from/by others. In turn, this may strengthen the higher sensitivity to social rejection.

Findings of a recent review postulate this reciprocal interplay between social rejection and mental health problems (47). However, the positive association between RS and depressive symptoms may be in part attributed to the overlap of the same underlying symptoms. Recent research demonstrates that high levels of RS are associated with depression (23–25). For instance, Chango et al. (25) found that high RS in mid-adolescence could predict depressive symptoms in later adolescence. Also, one prospective study postulates RS as a vulnerability factor for later depressive symptoms (48). In our study, insecure attachment was also significantly associated with RS, which is similar to previous findings [f.e. (19, 20)]. Consistent with the attachment theory (17), RS may be elicited by repeated negative interpersonal experiences from (early) childhood. Our results also show that childhood adversities are significantly associated with RS. This result correlates well-with previous findings (15, 16, 49). Brendgen emphasized parental rejection and aggression and also peer rejection as a significant factor for RS (49). Downey and Feldman suggested a strong relationship between childhood adversities like persistent familiar aggression and RS (8). However, childhood adversities seem to have a strong association with high RS, which also seems to be a crucial

factor in the etiology of SPD (32). Contrary to our hypothesis, the presence of SPD did not moderate the association between depressive symptoms, attachment style, childhood adversity and RS. This finding could have several possible explanations. One explanation could be the insufficient power of the model or the strong explanatory power of the main effects. Further research is needed to give more clarity.

### Strengths and Limitations

As the first study of its kind, we explored the association between RS and SPD, and we recruited a control group of similar age and gender distribution, which allows us to better discriminate the specifics of the patient group. While the present findings are important, additional research is needed to provide more insight and confirm the findings in greater depth. Our results should be interpreted within the scope of a cross-sectional design, whereby no causal relations can be postulated. Prospective studies should give more clarification and causality. One limitation is that we used self-reporting and retrospective instruments for the assessment of our study variables. Furthermore, a self-reporting instrument with fictive social situations measured RS. An experimental way to examine RS could be by a validated social exclusion paradigm, e.g., Cyberball (50). Moreover, differences among the subtypes of attachment concerning RS have not been investigated in the present study due to the small sample size for subgroup analyses. It is unclear how the different insecure attachment styles may affect RS. This should be investigated in future research. Furthermore, as the sample size calculation was conducted with respect to two-sample *t*-tests, it should be noted that the sample size might be too small to identify all relevant effects in the regression analysis. Therefore, corresponding results can be considered as preliminary and should be investigated further in future research. Almost all of our patients with SPD have a current depressive disorder. Therefore, the interaction between depression, RS, and SPD needs further analysis. Our findings are based on a comparison with a healthy control group. Further research can benefit from a comparison sample with someone also suffering from a mental disorder, and this allows us to differentiate between features that are more specific for SPD. In addition, we employed SCID-I for validation of the SPD according to the criteria of DSM-IV. In the fifth edition of DSM (2) the somatic symptom disorder (SSD) replaced the diagnosis of the somatoform pain disorder. SPD as a single entity is no longer in use. Also, other possible Axis-I and II disorders were not investigated and cannot be ruled out. Finally, we examined a selected patient group with high chronicity and symptom load, which searched for treatment in our clinic. It may be also interesting to investigate patients in the primary care setting.

### CLINICAL IMPLICATIONS AND CONCLUSION

The present study gives first insights into the association between RS and SPD. The results suggest that patients with SPD may have difficulties in social situations, more precisely



in situations of perceived social rejection. These results indicate the importance of RS in daily clinical practice with this patient group. Therapeutic treatments may improve patient sensitivity to rejection cues or interpretation of ambiguous situations more carefully. Several studies have shown the benefits of social support in various situations (51–53). One review (12) also demonstrated that social support has been associated with lower levels of perceived physical pain. As it is known that dimensions of insecure attachment moderate the relationship between social support and (mental and physical) health (54, 55), the attachment patterns should be considered according to the therapeutic treatment. Furthermore, insecure-attached individuals are sensitive to social rejection, regardless of the presence of SPD. In addition, an insecure attachment style, depressive symptoms and childhood adversities seem to play an important role for RS. Prospective studies are needed to figure out how RS is connected to SPD over the lifetime. Improving our knowledge would foster better-adapted therapeutic techniques.

## DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation, to any qualified researcher. Requests to access the dataset should be directed to [yeliz.nacak@uk-koeln.de](mailto:yeliz.nacak@uk-koeln.de).

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## ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Local Ethics Committee of the Friedrich-Alexander-University Erlangen-Nürnberg (FAU) (approval number: 46\_14B). The patients/participants provided their written informed consent to participate in this study.

## AUTHOR'S NOTE

The present work was performed by YN in fulfillment of the requirements of the Friedrich-Alexander-University Erlangen-Nürnberg (FAU) for obtaining the degree Dr. rer. biol. hum.

## AUTHOR CONTRIBUTIONS

YN and YE conceived of the presented idea. YN developed the theory and performed the computations. EM and YE verified the analytical methods. YN wrote the first draft of the manuscript. YE supervised the findings of this work. All authors contributed to the article and approved the submitted version.

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**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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