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Testing the Effectiveness of Cognitive Analytic Therapy for Hypersexuality Disorder:
An Intensive Time-Series Evaluation

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Abstract

The evidence base for treatment of hypersexuality disorder (HD) has few studies with appropriate methodological rigour. This study therefore conducted a single case experiment of cognitive analytic therapy (CAT) for HD using an A/B with extended follow-up design. Cruising, pornography usage, masturbation frequency and associated cognitions and emotions were measured daily in a 231-day time series. Following a 3-week assessment baseline (A - 21 days), treatment was delivered via outpatient sessions (B – 147 days), with the follow-up period lasting 63 days. Results show that cruising and pornography usage extinguished. The total sexual outlet score no longer met caseness and the primary nomothetic hypersexuality outcome measure met recovery criteria. Reduced pornography consumption was mediated by reduced obsessionality and greater interpersonal connectivity. The utility of the CAT model for intimacy problems shows promise. Directions for future HD outcome research are also provided.

Whilst hypersexuality has been well documented within clinical/research settings, debate as to whether hypersexuality can be categorized as a behavioral addiction or an impulse control disorder continues (Kor, Fogel, Reid & Potenza, 2013). Kafka (2010) assimilated the evidence base concerning excessive non-paraphilic sexual behavior to suggest the syndrome of Hypersexual Disorder (HD). Proposed diagnostic criteria were a 6-month duration of recurrent and intense sexual fantasies, urges or behaviors associated with 3 or more of the following: time spent on urges, fantasies or behaviors interfering with valued goals/activities (a1), engagement with urges, fantasies or behaviors occurs in response to negative affect (a2) or stressful life events (a3), repeated unsuccessful attempts to reduce urges, fantasies or behaviors (a4), disregard of the physical/emotional risk to self and others (a5), (b) clinically significant distress or impairment and (c) urges, fantasies or behaviors not occurring in response to an exogenous substance. An associated field study (Reid et al, 2012) showed high reliability and validity for these HD criteria.

All reviews of hypersexuality conclude (e.g. Stein, 2008) that more needs to be known about treatment effects. Rosenberg, Carnes & O'Connor (2014) reviewed the hypersexuality treatment evidence base and found no well controlled studies of any psychotherapy. The evidence base is also overwhelmingly made up of qualitative case reports (see Cavaglioni, 2010 for an example), which lurk on the bottom rung of methodological rigor/scientific credibility (Barlow & Hersen, 1984). Quadland (1985) compared N=30 bi/homosexual and hypersexual males, with N=30 males seeking treatment for other reasons. At 6-month follow-up, the hypersexual sample had experienced a significant drop in the number of sexual partners, a reduction in single event sexual encounters and reduced engagement in public sexual activity. Hartman, Ho, Arbour, Hambley and Lawson (2012) compared residential treatment for hypersexuality (N=21) with comorbid hypersexuality and substance misuse (N=36) samples to find

matched improvements in sexual compulsivity and quality of life for both groups.

Hardy, Ruchty, Hull and Hyde (2010) evaluated the effectiveness of an online psychoeducational package (N = 138) to show pre-post reductions in masturbation frequency and pornography usage.

Rosenberg et al.'s (2014) review of HD treatment was critical of the lack of credible treatment evaluation studies and Stein (2008) demanded the generation of modality-specific and systematic treatment outcome evidence. To address these research and treatment issues, the current study utilized a single case experimental design (SCED) N=1 outcome methodology (Barlow, Nock & Hersen, 2008) to evaluate the effectiveness of cognitive analytic therapy (CAT). No previous SCED study of HD treatment has been completed. The hypotheses (H) were: (H1): reliable and clinically significant reductions in sex addiction will occur during treatment and be maintained over follow-up, (H2) cruising, masturbation and pornography usage will significantly reduce during treatment and not reoccur during follow-up and (H3) significant reductions in sexual obsessions, interpersonal connectedness and negative emotions will occur during treatment and show no evidence of relapse. Whilst hypersexuality mediators are starting to be researched (Bancroft, 2008), there is currently no evidence concerning mediators of treatment outcome. The current study therefore also conducted an exploratory treatment outcome mediation analysis.

Method

Design

The current study utilised an A/B plus extended follow-up SCED. The baseline 'A' phase lasted for three weeks (N=21 daily measurements) and comprised three assessment sessions. The 'B' phase entailed CAT outpatient sessions that lasted for 21 weeks (N = 147 daily measurements) and comprised 13 sessions. The 'C' follow-up phase lasted for

9 weeks (N=63 daily measurements) with a single clinical review session at the end of that phase.

Participant: Sexual Compulsivity

The patient was a 41-year old married man, referred by a Community Psychiatric Nurse due to problems with anger, general impulsivity and relationship problems related to sexual addiction issues. Onset of hypersexuality problems was reported as in early adulthood. The following chronic sexual behaviours were reported, (a) high levels of daily masturbation, (b) high levels of internet pornography usage, (c) multiple affairs in his marriage, (d) infrequent cruising for sex with men, (e) high levels of sexual obsessions and fantasies and (f) occasional use of female prostitutes. The patient worked in management and his job required him to frequently travel between meetings. This enabled him to cruise or use to prostitutes and he would frequently covertly return home and use the Internet to access pornography and masturbate. The patient stated that on some days he would spend up to 4-5 hours watching pornography and masturbate up to 10 times per day. He described a strong dissociative element to the pornography usage, in that he would not notice the passage of time and would be consumed by the images. The normal pattern of satiation following orgasm (Berlin, 2008) was not experienced in this dissociative state, with the patient stating that he would often continue masturbating following orgasm, to induce the next orgasm. The patient would cruise for sex with older men; again there was a dissociative element, with the patient stating that he would engage in the sex whilst drunk and on 'autopilot.' Sexual obsessions and compulsions were reported with a great sense of shame. The patient stated that his wife knew of some of the affairs and that this had created distance and conflict in the relationship. The patient's wife did not know the true extent of his extra-marital affairs, the cruising or the excessive Internet usage.

Participant: Assessment and Reformulation

The history of the patient contained themes of abandonment, bullying and abuse, in the context of a nuclear family with one elder brother and one younger sister. The following paragraphs detail the history and the manner in which this was reformulated in the narrative reformulation, which was read to the patient at the start of the fourth session. This indicated the start of active treatment as is consistent with previous CAT outcome research (Kellett, 2005; 2007; Kellett & Hardy, 2013). The patient's father left the marriage when he was 10-years old, which he recalled as a majorly traumatic event (reformulated as the patient's tendency to abandon relationships via hypersexuality, to elicit abandonment from others by not attaching and the potential for him to struggle with the ending of the therapy). The father was known to have conducted many affairs during the marriage, with a lack of any real/sustained emotional contact between father and son (reformulated as infidelity being actively modelled to the patient and a now sustained lack of emotional connection in the patient's relationship with others and a potential for the patient to keep the therapist at arms-length). The patient's elder brother took on a quasi-parental role in the family when the father left and the patient reported being subsequently physically and emotionally bullied/dominated by his brother. He provided examples of many physical assaults by his brother, during which he would feel victimised and paralysed with fear. In late adolescence the patient turned the tables on his brother and achieved some parity (reformulated as the patient being capable of being at both ends of the bully-victim reciprocal role and the potential that the patient could experience the therapist as bullying). The patient's mother was described as consistently cold, distant and affectionless (reformulated as the patient learning how to shut out people and also his own emotions out as a result). The main survival strategies utilized during the patient's childhood were therefore reformulated as (a) emotional distancing and suppression and (b) interpersonal independence.

The parents attempted reconciliation when the patient was in his early teenage years and moved abroad to facilitate this. The patient was expelled from his local secondary school due to behavioural problems aged 15 (reformulated as rejecting the school system due to his loneliness and isolation within the family and school system). A local businessman offered the patient a part-time job and would take him on 'nights-out' during which he was plied with excessive alcohol. This grooming happened with increased frequency and then culminated in the sexual abuse of the patient. The patient stated that he was often too drunk to notice or care about the abuse and could be therefore be emotionally disengaged and protected from what was happening. The patient stated starting to accept the grim inevitability that any night out meant being subject to rape and so he started to drink alcohol even more to cope. This was reformulated as (a) the shame of the abuse being intolerable and now creating unmanageable feelings that could only be calmed/soothed by repeated sexual behaviour, (b) being in an abuser position in relation to his partner, (c) seeking out the abused position when cruising for sex with older men in which he would take a submissive role and (d) alcohol being a means of dissociating from intolerable feelings and also being a part of a procedure of lessening inhibitions for further sexual activity.

The patient reported chronic and frequent explosive and aggressive episodes in social settings and reported that he was particularly likely to lose his temper in his marriage. He reported chronic problems with emotional intimacy in his marriage. The patient had a forensic history of charges of assault against strangers, picked fights with others in order to induce conflict and had a tendency towards experiencing 'road rage' with physical confrontations a frequent outcome. The patient described a schism between his private self (described as pathetic, unassertive and unlikable) and his public self (described as brash, performing and everyone's friend). Frequent heavy binge drinking was reported as a consistent feature of his adult life.

Treatment

Therapy was provided by an Association of Cognitive Analytic Therapists (ACAT) accredited CAT Practitioner and Consultant Clinical Psychologist. Treatment was delivered under routine care conditions in the National Health Service in the UK. CAT is a relational, collaborative and time-limited psychotherapy that integrates cognitive and analytic principles, whose assessment and treatment methods have been clearly established and delineated (Ryle & Kerr, 2002). CAT contains three phases (1) assessment leading to a narrative reformulation of the patient's difficulties, (2) a second phase of enhanced recognition of problematic states and procedures via production of a sequential diagrammatic reformulation (see Figure 1 for SDR), with associated between session self-monitoring to enhance self-awareness of problematic patterns and roles and (3) a final revision stage focussed on change followed by 'goodbye letters' written and exchanged by therapist and patient at the final session. The evidence base for CAT has recently been systematically reviewed and is made up of typically high quality studies (Calvert & Kellett, 2014), with a meta-analysed mean effect size of $d+=0.83$ (Ryle, Kellett, Hepple & Calvert, 2014).

Insert Figure 1 here please

The final revision phase entailed five major aspects (1) analysis of reciprocal role enactments in the therapeutic relationship, (2) engaging in alliance rupture-repair sequences, (3) exposure to obsessions and response prevention to compulsions, (4) exposure to a hierarchy of relational intimacy activities and (5) working through of abuse memories and the shame related to the abuse. In keeping with CAT practice, changes were visually labelled as 'exits' on the SDR (Ryle & Kerr, 2002).

Ideographic Hypersexuality Measures

Seven idiosyncratic measures collected via a daily diary. The first three measures concerned behavioural indices of hypersexuality; (1) incidence count of cruising, (2) total time spent consuming pornography and (3) daily masturbation count. The next four measures were Likert measures concerning hypersexuality cognitions, relationality and emotions. Item 4 was a measure of intensity of sexual intrusions ranging from 1 *'free from obsessing about sex'* to 9 *'obsessing about sex'* and item 5 was a measure of interpersonal connectivity ranging from 1 *'connected'* to 9 *'distant and sarcastic.'* Item 6 measured anxiety from 1 *'not anxious at all'* to 9 *'full of anxiety'*, with the final ideographic measure an item ranging from 1 *'hating myself'* and 9 *'full of self-worth.'*

Nomothetic Measures

The patient completed a battery of validated self-report psychometric outcome measures at screening, end of treatment and at follow-up. The measures were as follows:-

Sexual Compulsivity Scale (SCS; Kalichman & Rompa, 1995). This single factor 7-item scale yields a total sex addiction score (10-40), with a cut-off score of ≥ 24 being indicative of sex addiction (Benotsch, Kalichman, & Kelley, 1999; Cooper, Delmonico, & Burg, 2000; Parsons, Bimbi, & Halkitis, 2001). The SCS has good internal reliability, test-retest reliability, convergent (Gaither & Sellbom, 2003), discriminant (O'Leary, Fisher, Purcell, Spikes, & Gomez, 2007) and criterion-related validity (Dodge, Reece, Cole, & Sandfort, 2004).

Beck Depression Inventory-II (BDI-II; Beck, Steer & Brown, 1996). This 21-item scale measures severity of depressive symptomology (Beck et al., 1996). Cut-off scores are minimal (0–13), mild (14–19), moderate (20–28) and severe (29–63). The BDI-II is a widely used, valid and reliable measure (Beck, Steer, Ball & Ranieri, 1996).

Brief Symptom Inventory (BSI; Derogatis, 1993). This 53-item scale measures nine primary symptom dimensions, from which three global indices are calculated (a) global severity index (GSI), (b) positive symptom distress index (PSDI) and (c) positive symptom total (PST). The measure has good internal and test-retest reliability and has good convergent, discriminant and construct validity (Derogatis, 1993).

Inventory of Interpersonal Problems-32 (IIP-32; Barkham, Hardy & Startup, 1996). This 32-item scale measure contains four scales that index deficits in interpersonal functioning and four scales that index dysfunctional interpersonal strategies. A review has reported good psychometric properties (Hughes & Barkham, 2005).

Data analysis strategy

Data of the length and kind created by the current study risks the potential misinterpretation of treatment effects when serial dependency (i.e. autocorrelation) within the time series is not adequately accounted for (Reis & Judd, 2000). Serial dependency concerns the phenomenon whereby individual observations are influenced by previous temporally contiguous recordings or show similar patterns at certain intervals over time (Reis & Judd, 2000). Partial autocorrelations (PACF) of the time-series for the ideographic variables were examined to define the best lag to use as an explanatory factor (covariate) in the analysis of the ideographic measures. This removed any serial dependency to ensure that each daily observation was independent (Chatfield, 2003). The first-order lag (see Figure 2 for an example) was the most appropriate across all the ideographic measures (apart from pornography usage which was lag-7).

Insert Figure 2 here

Frequency of orgasm has been established as a method of calculating total sexual outlet (TSO) scores (Kinsey et al., 1948). A consistent TSO score ≥ 7 per week is indicative of sex addiction (Kafka, 1997) with a weekly median of 1.99 for community males (Kinsey, Pomeroy & Martin, 1948). Daily masturbation count was therefore used to calculate the weekly TSO scores. The mediation analysis evaluated whether the effects of therapy on the amount of daily time spent using pornography were created by the observed changes in cognitions, connectivity and emotions. Hayes and Preacher's (2014) procedure for mediation with multi-categorical independent variables created two dummy variables to examine the relative effects of treatment (treatment or follow-up, coded 1), relative to baseline (coded 0). A bootstrapping multiple mediation model was tested with pornography usage as the dependent variable and sexual obsessions, connectivity, anxiety and self-worth as four simultaneous mediators, with the lags of each of these variables included as covariates.

Outcomes on the psychometric measures were analysed using the Jacobson and Traux (1991) reliable change index (RCI). To achieve a reliable change in hypersexuality, the assessment-termination SCS treatment comparison would need to produce a significant RCI score (i.e. ≥ 1.96). For this change to be clinically significant the final SCS score would need to be < 23 (Hook, Hook, Davis, Worthington & Penberthy, 2010). A reliable and clinically significant change in hypersexuality would be recorded should both a positive RCI statistic occur and the termination score place the patient within a community norm on the SCS. Reliable and clinically significant change is used to evidence 'recovery' in practice-based research (Barkham, Stiles, Connell & Mellor-Clark, 2012). RCI analyses were conducted on the assessment to termination SCS scores (to measure the effectiveness of the CAT) and also on the termination to follow-up data (to measure the durability of the change and assess for signs of relapse).

Results

Table 1 reports the means (SDs) of the ideographic measures according to phase of study and Table 2 summarises the nomothetic outcome measures at assessment, termination and follow-up. On the primary outcome measure of hypersexuality (SCS), recovery criteria was met by the end of treatment (SCS RCI = 3.02, $p < 0.01$, plus termination SCS score < 23). Continued (but non-significant; RCI = 1.78) progress was evident over the follow-up period on the SCS. Reliable pre-post improvements were found for depression (BDI-II RCI = 5.69, $p < 0.01$), interpersonal problems (IIP-32 RCI = 4.47, $p < 0.01$) and general psychiatric symptoms (BSI-GSI RCI = 6.87, $p < 0.01$). No reliable deteriorations occurred from termination to follow up on any nomothetic measures, indicating effective treatment with a durable effect (supporting H1).

Insert tables 1 and 2 here please

In terms of the behavioural ideographic measures, cruising and pornography usage extinguished during treatment, with masturbation frequency significantly reduced. Cruising occurred on two separate occasions during the baseline phase; no further cruising episodes were recorded during treatment or follow-up (supporting H2). Table 1 (pornography usage means and SDs by study phase) and Figure 3 (daily plot of time spent watching pornography over the baseline and treatment phases) illustrate marked reductions to pornography usage over time (supporting H2). Pornography usage extinguished approximately halfway through treatment, with no relapse over the follow-up period. The clinical significance of this behavioural change is contextualised by comparison to baseline when pornography was consumed on 57.14% of baseline days (i.e. on 12 non-consecutive days in the 21 day baseline). During baseline days, mean duration of pornography consumption time was almost two hours ($M = 110.50$ minutes,

SD = 78.14) and on two days over 4 hours were spent watching pornography.

Figure 4 graphs daily masturbation frequency. During the baseline, masturbation occurred on 90.47% of days (i.e. on 19 days in the 21 day in the baseline). The mean number of masturbation episodes was 3.28 (SD = 1.87) per day, with a maximum number of 6 masturbation events in one day (occurring on 3 days). TSO analysis noted that the criteria for hypersexuality was met across the baseline (TSO+ for each week) and also the first 5 weeks of active treatment. Then, at no further point across treatment and follow-up did the TSO score meet caseness.

Insert figures 3 and 4 here please

Binary logistic regressions predicted pornography usage incidence (patient did vs. did not use pornography) and masturbation incidence (patient did vs. did not masturbate) from baseline compared to treatment and follow-up. The full regression model for pornography usage was significant ($X^2(3) = 53.37, p < .01$) and the Nagelkerke pseudo R^2 (indicating goodness of fit of the logistic regression model) was 0.43, meaning the model explained 43% of the variance in pornography usage. The model correctly predicted 93.0% of incidents of pornography usage (39.1% patient did use pornography, 99.0% patient did not use pornography). Treatment had a significant effect on reduced use of pornography (Wald $X^2(1) = 13.75, p < .01$), but the follow-up phase did not (Wald $X^2(1) = 0.00, p = .98$). The odds in favour of not using pornography were nearly 10 times higher during treatment (9.71). The masturbation regression model as a whole was also significant ($X^2(3) = 90.28, p < .01$). The Nagelkerke pseudo R^2 was 0.47, explaining 47% of the variance in masturbation incidents. The model correctly classified 84.8% of incidents of masturbation (68.2% patient did masturbate, 91.5% patient did not masturbate). Stage of contact was significant for treatment (Wald $X^2(1) = 7.71, p < .01$)

and the follow-up (Wald $\chi^2(1) = 9.57, p < .01$). The odds in favour of not masturbating were 20 times higher during treatment (20.83), and then increased during follow-up to 34.48.

An analysis of covariance with phase of study (baseline, treatment and follow-up) as the factor was significant for time spent using pornography ($F(2,231) = 33.99, p < 0.001$), but with a small associated effect size (partial η^2) of .23. Simple contrasts of pornography usage between baseline and treatment phases showed significant reductions ($M = 8.22; t(168) = -72.32, p < .001$), as did the baseline to follow-up phase comparison ($M = 3.56; t(90) = -76.32, p < .001$). There was also a significant phase of study effect for masturbation frequency ($F(2,231) = 26.61, p < 0.001$), but again with small effect size (partial η^2) of 0.19. Masturbation frequency significantly reduced between baseline and treatment ($M = 0.54; t(166) = -1.77, p < .001$) and between baseline and follow-up ($M = 0.37; t(84) = -1.93, p < .001$).

Figure 5 graphs the changes to the cognitive, relational and emotional ideographic measures. Phase of study was significant (with small associated effect sizes) for obsessing about sex ($F(2,231) = 23.84, p < 0.001, \text{partial } \eta^2 = 0.17$), interpersonal connectedness ($F(2,231) = 35.94, p < 0.001, \text{partial } \eta^2 = 0.24$), anxiety ($F(2,231) = 34.04, p < 0.001, \text{partial } \eta^2 = 0.23$) and self-esteem ($F(2,231) = 22.07, p < 0.001, \text{partial } \eta^2 = 0.16$). Simple contrasts found that during treatment (compared to the baseline phase) significant reductions occurred in obsessions about sex ($M = 2.49; t(166) = -2.26, p < .001$), being interpersonally disconnected ($M = 2.44; t(166) = 2.57, p < .001$) and feeling anxious ($M = 2.45; t(166) = -2.58, p < .001$). During treatment, there was a significant increase in self-esteem ($M = 7.25; t(166) = 1.96, p < .001$).

The results of the mediation analysis are shown in Figure 6. Significant indirect effects were found for reduced sexual obsessions during treatment (indirect effect = -51.32; 95% CI: [-87.27, -28.34]) and follow-up (indirect effect = -43.68; 95% CI: [-

74.97, -23.14]). Also significant indirect effects were also found for reduced disconnection during treatment (indirect effect = 22.11; 95% CI: [2.99, 56.08]) and follow-up (indirect effect = 17.96; 95% CI: [1.90, 47.27]). The anxiety and self-worth measures did not show significant indirect effects during treatment or follow-up. The results for disconnection were found to be due to collinearity with the other mediators and the sign of the relationship was reversed and significant when it was tested as a sole mediator during treatment (indirect effect = -11.94; 95% CI: [-28.17, -0.48]) and follow-up (indirect effect = -14.92; 95% CI: [-33.33, -0.22]). The findings indicate that the effects of treatment in reducing pornography usage were mediated by reduced sexual obsessions and greater connectivity with others.

Insert Figure 5 and 6 here please

In order to assess the durability of clinical change (H3), comparisons of baseline and follow-up phases showed significant reductions in sexual obsessions ($M = 1.88$; $t(84) = -2.87$, $p < .001$) and anxiety ($M = 1.86$; $t(84) = -3.58$, $p < .001$). There were significant improvements in self-esteem ($M = 8.01$; $t(84) = 2.72$, $p < .001$) and interpersonal connectedness ($M = 1.90$; $t(84) = 2.72$, $p < .001$) in baseline to follow-up comparisons. Phase of study were significant (with small associated effect sizes) for self-esteem ($F(2,231) = 22.07$, $p < 0.001$, partial $\eta^2 = 0.16$), anxiety ($F(2,231) = 34.04$, $p < 0.001$, partial $\eta^2 = 0.23$), interpersonal connectedness ($F(2,231) = 35.94$, $p < 0.001$, partial $\eta^2 = 0.24$) and obsessing about sex ($F(2,231) = 23.84$, $p < 0.001$, partial $\eta^2 = 0.17$).

Discussion

The current study examined in close detail the effectiveness of a 16-session CAT treatment of hypersexuality and was achieved via the completion of the first known SCED

to be accomplished in the treatment outcome literature. Results would suggest that the CAT was effective, as the recovery criterion was met (a) on the primary nomothetic outcome measure and (b) on TSO analysis of the time series data. Significant reductions occurred in ideographic measures in the context of fairly stable baselines (evidenced by the small SDs during the baseline phase), indicating that change was not solely due to therapist contact. The results for the odds in favour analysis of non-occurrence of masturbation and pornography usage were impressive. Whilst there were statistically significant phase of treatment effects, associated effect sizes were generally small (all the partial η^2 results were less than 0.23). The fact that cruising and pathological usage of pornography was extinguished, is perhaps more convincing and relevant than the effect size evidence. Across the ideographic and nomothetic measures there was little evidence of relapse, with some evidence of continued (non-reliable) positive change during follow-up. This would suggest that the patient was continuing to use the therapy after completion of treatment.

Developmental factors contributing to risk of hypersexuality have been reviewed (Schwartz, 2008) and are proposed to consist of attachment problems and trauma re-enactments, with the current case closely resembling this evidence. The patient's attachment behavior could be likened to a disorder of bonding/intimacy, due to the apparent impaired sense of self, difficulties with affect regulation and problems with the ability to turn to others when needing comfort/safety (Marshall, 1993). When histories are marred by sexual abuse, it is predicted that patients can then seek to repeat elements of a traumatic event (as was the case with the cruising) and in identifying with the aggressor can display the 'acting-out' of sex addiction (Miller, 1990). Analytically, this is conceptualized as an erotic form of hatred, centered on a theme of revenge (Stoller, 1986). Watson (2010) described narcissistic damage as often at the heart of hypersexuality, with the patient having a narcissistic edge (see for example the distant

and sarcastic ideographic measure). The therapeutic relationship appeared the context in which the patient initially tested out changes to emotional intimacy patterns, to then generalize to other relationships.

The graphing of the time-series data has thrown some empirical light on the initiation and durability of change during treatment. The effect of the narrative reformulation was marked and appeared to initiate therapeutic change. Previous CAT outcome research has evidenced 'sudden gains' at the point of narrative reformulation (Kellett, Bennett, Ryle & Thake, 2013). The 'exit work' conducted during the final revision stage of treatment (Ryle & Kerr, 2002) however was necessary to support the insight facilitated by narrative/diagrammatic reformulation. Mediation analysis illustrated that pornography usage was mediated by both reducing obsessions and also the greater relational connectivity. It is interesting that increased self-worth was not shown to be a significant mediator of pornography usage, as the hypersexuality clinical treatment literature has placed great store in improving self-esteem (Walsh, 1991).

The N=1 sample represents the main methodological weakness of the current study, as results may not generalize to other hypersexuality patients (Barlow, Nock & Hersen, 2008). The TSO scores (Kinsey et al., 1948) may have slightly underestimated actual sexual output, as it did not measure frequency of sexual contact in the marriage. The absence of contemporaneous ratings from third parties is also acknowledged as a study weakness. As sessions were not audio-recorded, competency in CAT (CCAT; Bennett & Parry, 2004) ratings were unattainable. The methodology would have been significantly strengthened by an extension to the follow-up period and future studies might also consider the use of vector autoregression for assessing the interdependencies between the different time-series (e.g., Binder & Coad, 2010).

The hypersexuality evidence base does not yet contain any RCT-style evaluations, which illustrates how difficult such trials are to conduct and complete when patients are

reluctant to engage in treatment (Bower & Gilbody, 2010). For example, Schwartz and Berlin (2008) highlighted that patients may avoid seeking help due to heightened shame and embarrassment. SCED effectively both addresses the idiosyncratic needs of the particular patient being treated (Newell & Burnard, 2006) and also illuminates the shape and speed of symptomatic change in a manner impossible to achieve during group studies (Barlow et al., 2008). Building an evidence base on the foundation of a portfolio of SCED evidence is therefore indicated. Development of practice-research networks regarding outcome (Castonguay, Locke & Hayes, 2011), may also prove an efficient manner of combining data across sites/clinicians. Future treatment outcome studies should employ the SCS as the primary outcome measure, as it has sufficient psychometric validation to enable RCI analyses.

In conclusion, the current study has provided an intricate, patient-centred and longitudinal insight into the day-to-day existence of a patient with HD undergoing CAT. Hypersexuality has been viewed as difficult to treat due to the attendant shame issues, with significant risk of dropout and behavioural relapse over time (Schwartz & Berlin, 2008). The collaborative approach of CAT therefore appeared particularly useful in portraying to the patient the relational impact of his sex addiction and that relational change (i.e. enabling true intimacy) was possible and useful. Reduced obsessionality and improving interpersonal connectivity mediated an aspect of outcome and future sex addiction treatment mediation studies sorely needed. To have real clinical value, biopsychosocial treatment outcomes of HD need to be triangulated across psychometric, clinician-rated and neurological indices in future large and well-controlled outcomes studies. This study represents a contribution to an evidence base that has been repeatedly criticised for being theory heavy and evidence light (Gold & Heffner, 1988).

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Figure 1; SDR for the case

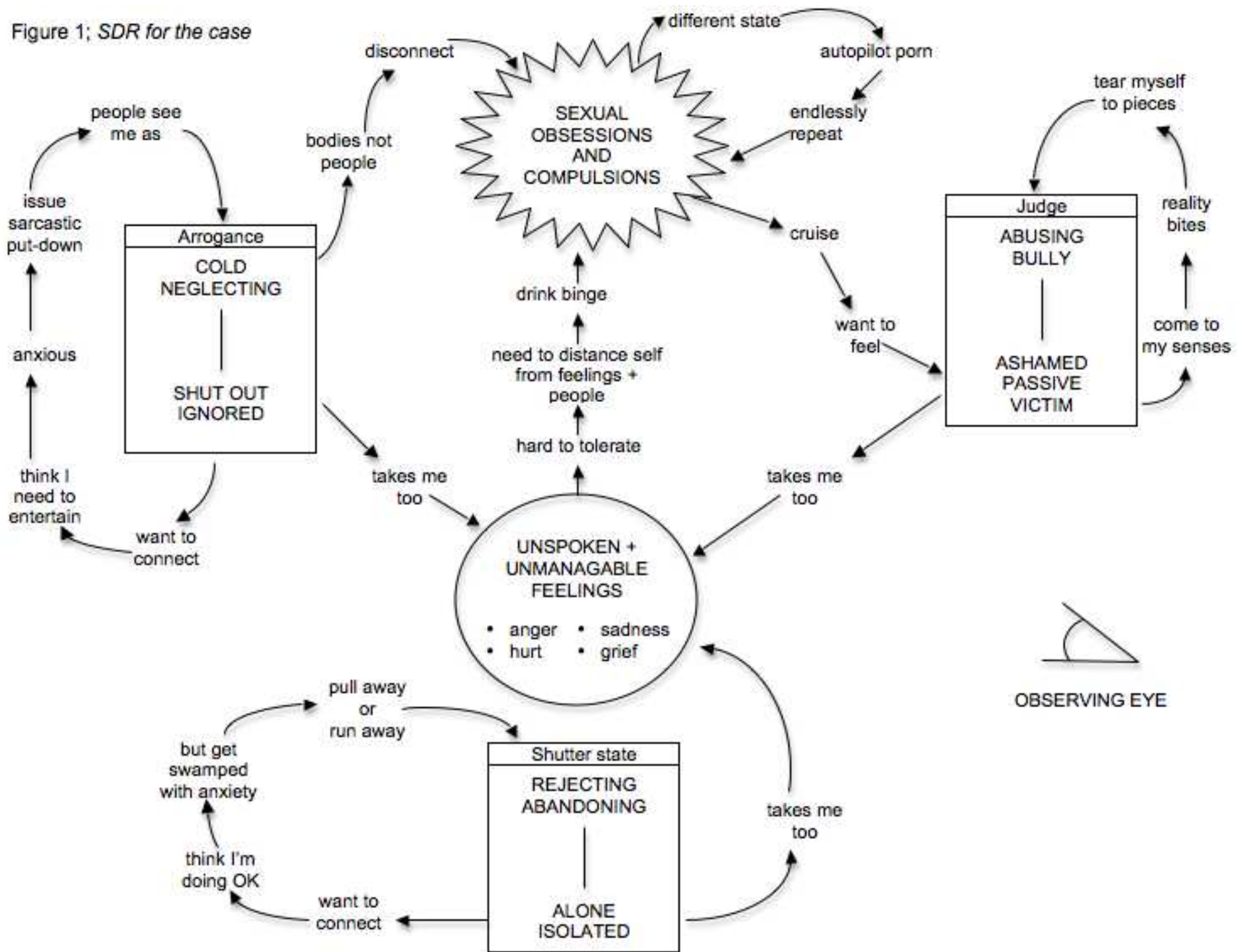


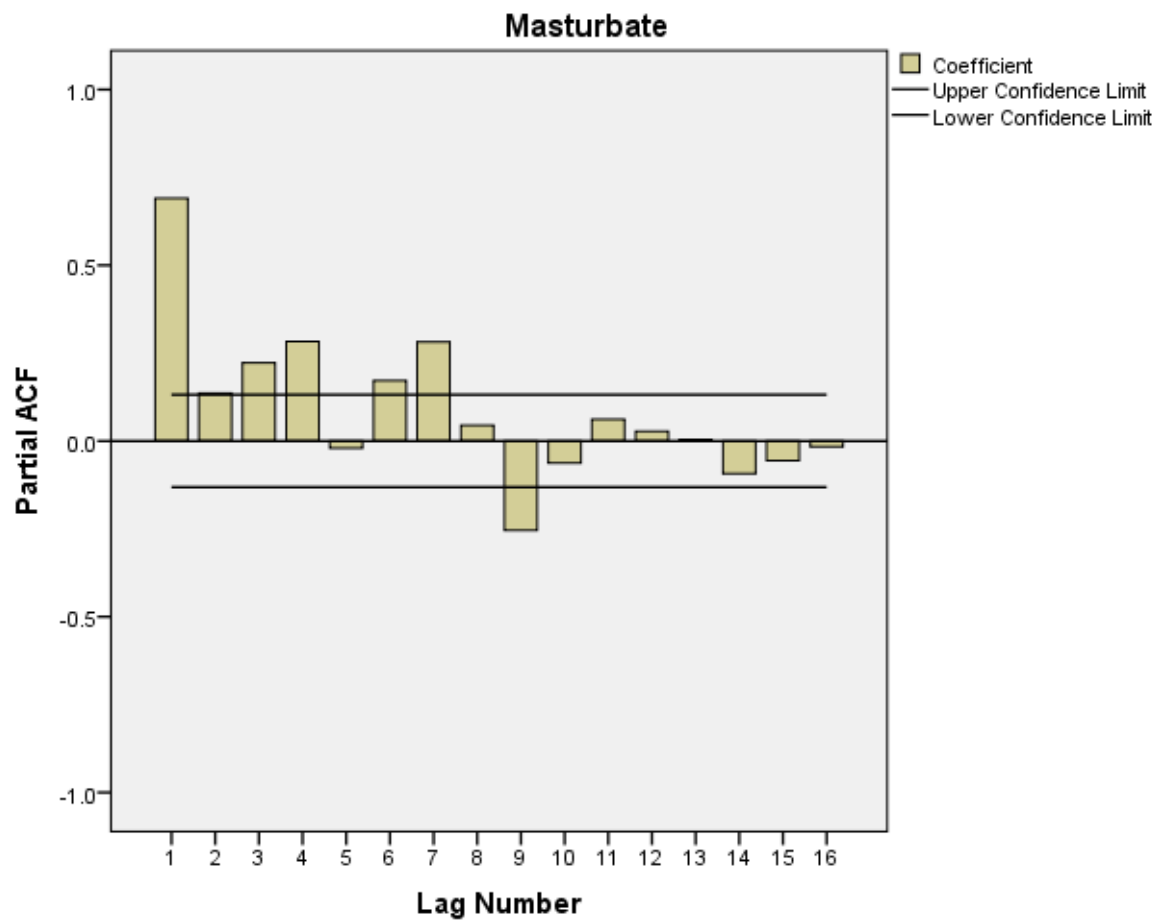
Figure 2; *partial autocorrelation function (PACF) plot of masturbation frequency*

Figure 3; *time spent watching pornography by phase of study*

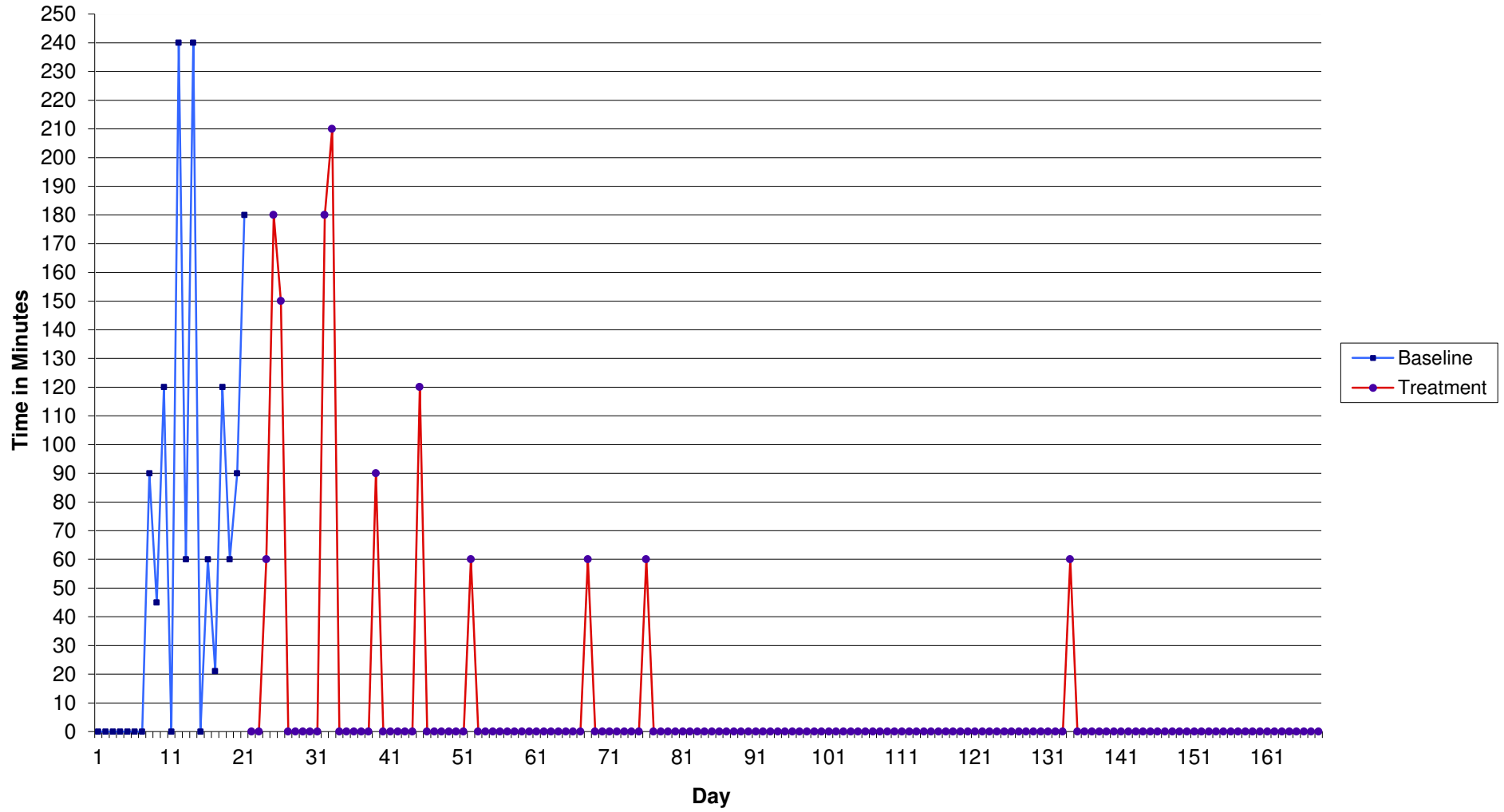


Figure 4; *Daily masturbation frequency by phase of study*

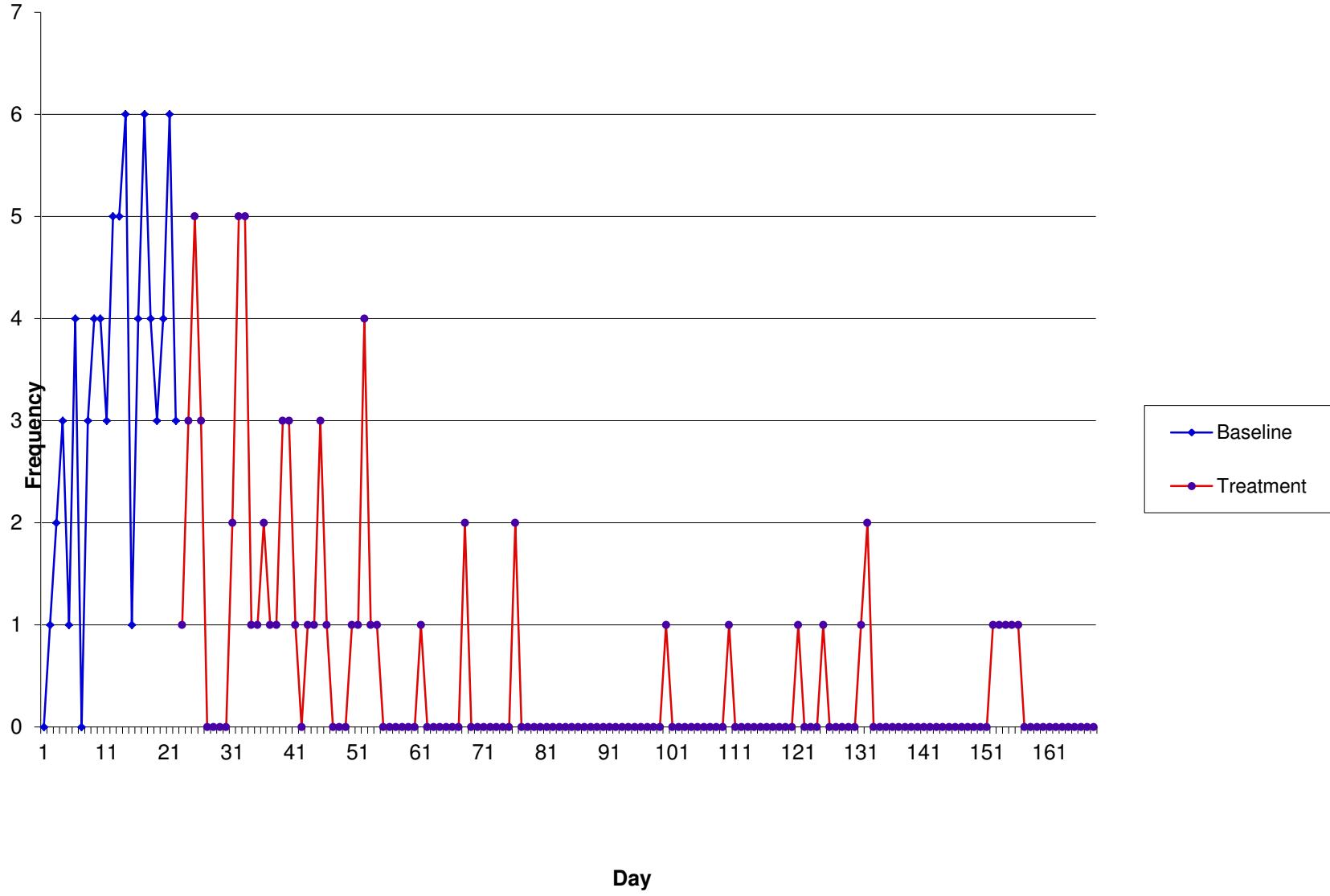


Figure 5 ; grand phase means for the cognitive, emotional and relational ideographic measures

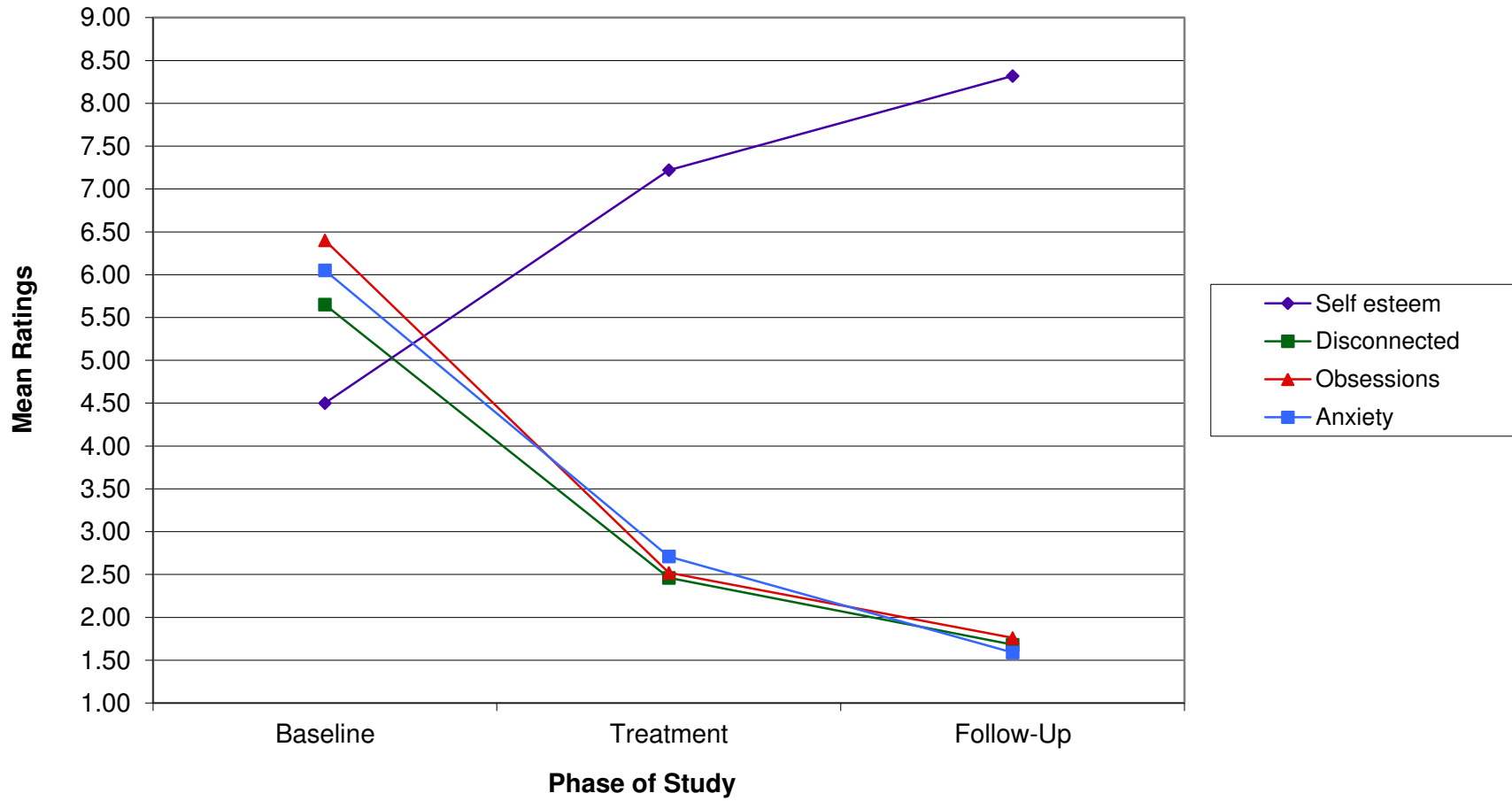


Table 1; results by study phase for ideographic measures

	Baseline Mean (SD)	Treatment Mean (SD)	Follow-up Mean (SD)	F-value	Partial Eta Squared
Pornography time	94.71 (78.58)	8.42 (33.37)	0.00 (0.00)	47.57*	0.39
Masturbation	3.45 (1.76)	0.48 (1.03)	0.14 (0.35)	102.94*	0.57
Self-esteem	4.50 (1.63)	7.22 (1.63)	8.32 (0.59)	49.43*	0.39
Disconnected	5.65 (1.95)	2.46 (1.37)	1.65 (0.67)	57.69*	0.43
Sexual obsessions	6.40 (1.66)	2.52 (1.45)	1.76 (0.70)	82.52*	0.52
Anxiety	6.05 (1.68)	2.71 (1.81)	1.59 (0.68)	53.62*	0.41

*p<0.001

Table 2; results for the nomothetic measures

	Assessment	Termination	Assessment versus term RCI	Follow-up	Termination versus follow-up RCI
Beck Depression Inventory-II	36	7	5.69*	4	0.59
BSI-Global Severity Index	2.15	0.00	6.87*	0.00	0.00
Inventory of Interpersonal Problems-32	2.25	0.50	4.47*	0.00	0.00
Sexual Compulsivity Scale	37	20	3.07*	10	1.78

*p<0.01

Figure 6; Cognitions, relations, and emotions as mediators of the effect of therapy on time spent watching pornography. Path coefficients are shown. * $p < .05$, ** $p < .01$.

