Measurement of romantic jealousy: Behavioural responsivity to jealousy provocation in adult romantic relationships

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Declaration

This thesis has been submitted for the award of Doctorate in Clinical Psychology at The University of Sheffield. It has not been submitted for any other qualification or to any other academic institution.

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Abstract

Literature Review: A systematic review of the psychometric properties and quality of self-report measures of romantic jealousy was conducted. Twenty-four papers were identified. After the application of minimum quality standards, 12 papers concerning eight measures were examined. Overall, measures showed adequate reliability and convergent validity, but lacked evidence of divergent and content validity. There was insufficient evidence of criterion validity, responsiveness, acceptability, feasibility and precision. The Multidimensional Jealousy Scale and the Short-Form Multidimensional Jealousy Scale appear the most fit for purpose as assessment and research tools.

Empirical Report: Jealousy is a complex emotion to conceptualise and therefore measure. Jealous behaviour is often highlighted as the defining characteristic in pathological jealousy; however, jealousy measures fail to focus on this component. The present study details the development and evaluation of the Jealousy Provocation Measure (JPM), designed to assess behavioural responsivity to an evolving jealousy scenario, grounded in attachment theory. Using an on-line survey, 720 participants from community, student and clinical (Obsessive Compulsive Disorder; OCD) samples completed the JPM and measures of jealousy, attachment, OCD and impulsivity. The JPM showed good internal consistency and adequate convergent and divergent validity. Increased jealousy was associated with increasing behavioural reactivity. Participants with OCD had significantly higher levels of jealousy and behavioural reactivity. At low levels of relationship threat, both participants with OCD and those with anxious attachment showed increased reactivity to jealousy provocation. The JPM shows promise as an effective measure of jealousy with clinical utility.

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Section One: Literature Review

Systematic review of the quality of self-report measures of romantic jealousy

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Abstract

Purpose. Assessment of romantic jealousy has resulted in the development of a variety of self-report measures. However, there has been no previous systematic review of the psychometric properties of such measures. This review critically examines the quality of jealousy measures, through the examination of psychometric properties and attributes.

Method. Studies detailing the development of measures of romantic jealousy were extracted from Web of Science, PsychINFO and PubMed databases. Following application of minimum quality standards, 12 papers concerning eight measures were analysed.

Results. All measures had adequate internal consistency and showed evidence of convergent validity. Proof of criterion, divergent and content validity was less apparent. Compared to other measures, the Multidimensional Jealousy Scale (MJS) and the Short-Form Multidimensional Jealousy Scale (SF-MJS) had the best psychometric foundations. All measures lacked sufficient evidence of responsiveness, acceptability, feasibility and precision.

Conclusion. Overall, there is a lack of well-validated measures appropriate for clinical usage. The MJS and the SF-MJS appear the most fit for purpose jealousy assessment tools.

Practitioner Points

- Selection of jealousy assessment measures should be guided by evidence of their psychometric foundations.
- Poor psychometric foundation risks inaccurate assessment and subsequent poor treatment planning.
- Jealousy needs to be assessed via dovetailing patient and partner clinical interviewing with psychometric evaluation.

Systematic review of the quality of self-report measures of romantic jealousy

Jealousy in romantic relationships is a common experience (Mullen & Martin, 1994) defined by unpleasant feelings towards a real, imagined or perceived rival. A growing body of research suggests jealousy serves a negative function in relationship problems (Elphinston, Feeney & Noller, 2011) and is attributed as a factor in marital problems and divorce (e.g. Docherty & Ellis, 1976), relational dissatisfaction (e.g. Guerrero & Eloy, 1992), verbal and physical abuse (e.g. Barnett, Martinez & Bluestein, 1995) and violence and relational conflict (e.g. Hansen, 1991; Stets & Pirog-Good, 1987).

When jealousy exceeds levels prescribed as the 'norm' within a specific culture or society, it is labelled as pathological (Mazzariti et al., 2003). The Diagnostic and Statistical Manual of Mental Disorders, fifth edition, (DSM-5; American Psychiatric Association; APA, 2013) does not conceptualise pathological jealousy as a single entity. It is identified either as an obsessive-compulsive phenomenon/psychopathology, or as the only delusion in Delusional Disorder- Jealous Type (DSM-5, APA, 2013). Pathological jealousy has been related to clinical problems such as, alcoholism (e.g. Foran & O'Leary, 2008; Michael, Mirza, Mirza, Babu & Vithayathil, 1995), anxiety and depression (e.g. Mathes, Adams & Davies, 1985), low self-esteem (e.g. Guerrero & Afifi, 1999), dependency (e.g. Ellis, 1996) and suicide (Mooney, 1965; Mullen, 1995). Jealousy lacks standardised assessments that promote efficient and effective clinical practice. White (1984) suggested that scientific development of effective treatment has been hindered by the theoretical problem of defining jealousy and lack of validated measures.

Early attempts to measure jealousy, proposed unidimensional scales conceptualising jealousy as a disposition (Bringle, 1981). Jealousy was theorised as a consistent trait across work, family, social and sexual relationships. Pfeiffer and Wong (1989) criticised this approach, highlighting that unidimensional scales were not all measuring the same aspect of jealousy. Multidimensional conceptualisations of jealousy grew from scales developed through testing face-valid items on large samples of participants (Tipton, Benedictson, Mahoney & Hartnett, 1987; White, 1981a). Factor analysis found multiple emerging factors, such as a need for intimacy/loyalty (Tipton et al., 1987) and feelings of inadequacy (White, 1981b). The emerging factors within measures have shown some degree of convergence, suggesting there are defined, yet multiple factors, comprising jealousy (White, 1981a). White (1981a) defined jealousy as a multidimensional concept composed of three components: thoughts, feelings and behaviours. Pfeiffer and Wong (1989) suggested that White's theory of jealousy was rational, yet unable to explain often-irrational elements of jealousy. A parallel interactive model was developed to account for both rational and irrational jealousy. The model conceptualised that three components (thoughts, emotions, behaviours) could occur simultaneously, interact with each other and exist on a continuum from 'normal' to pathological (Elphinston et al., 2011; Pfeiffer & Wong, 1989).

Diversity in approach to conceptualise and develop jealousy measures has resulted in an array of measures lacking standardisation and psychometric validation. Pathological jealousy is a relatively frequent clinical problem with potentially severe outcomes (De Silva, 1994, 1997; De Silva & Marks, 1994; Kingham & Gordon, 2004). Absence of sound assessment measures, with sufficient reliability and validity, limits treatment development and evaluation.

Clinicians are unable to make clear assessments of jealousy, compromising subsequent intervention effectiveness and researchers struggle to compare results across studies. To date there has been no systematic review of existing jealousy measures. The aim of this study was therefore to review the methodological and psychometric quality of published self-report measures of romantic jealousy.

Method

Search Strategy

The first of two search strategy steps involved using the Web of Science (from 1864), PsychINFO (from 1860) and PubMed (from 1809) databases up until the 31st October 2015. The search terms used were: 'jealou*', 'outcome measure', 'measure', 'assessment', 'psychometric', 'scale', 'survey', 'validity', 'reliability'. The keywords were searched for anywhere (title, abstract, text etc.), the term 'jealou*' was combined with the other search terms using the Boolean operator "AND". Papers were included at this stage based on titles and abstracts; full texts were read where necessary. Reference lists of included papers were hand searched for relevant literature.

A filtering process of the reviewed papers adapted from Moher, Liberati, Tetzlaff, and Altman (2009) was used and is shown in Figure 1. After removal of duplicates, 1030 papers were rated against the inclusion criteria.

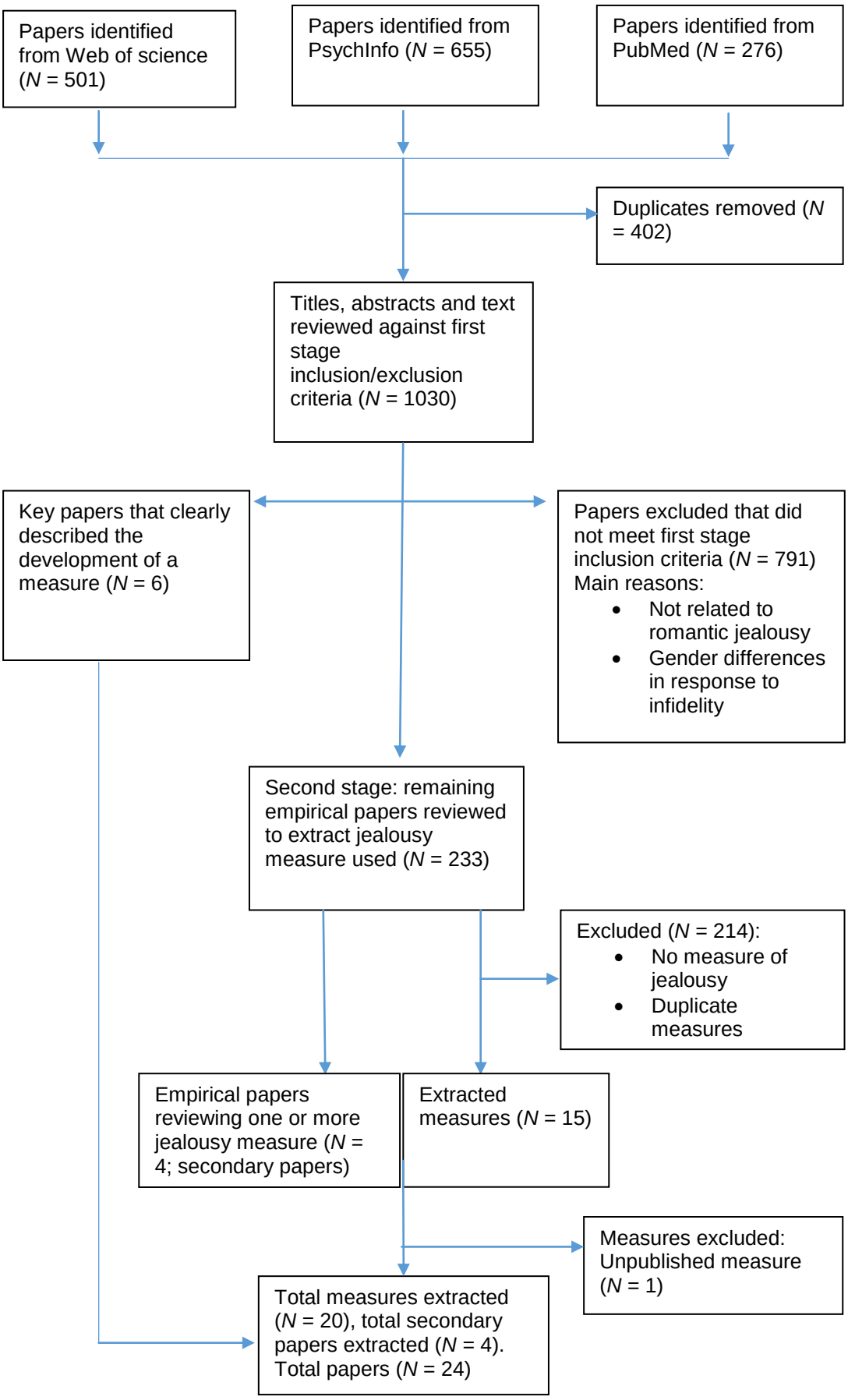

Figure 1: PRISMA flow diagram of measure selection.

Inclusion/ Exclusion Criteria

Papers published in English and within peer-reviewed journals or books were included. Only studies concerning adult (18 years+) populations were considered. During the first stage of the search process, any paper that focused on romantic jealousy was included. Papers were excluded based upon the following criteria: (i) focus on jealousy outside of romantic relationships (e.g. friends), (ii) focus on gender differences in jealousy and/or gendered response to infidelity (e.g. males and females tested for which they find most jealousy provoking: emotional or sexual infidelity. e.g. Buunk, Angleitner, Oubaid & Buss, 1996), (iii) measure of purposeful induction of jealousy between partners. After titles, abstracts and text were screened for first stage inclusion and exclusion criteria, 239 papers were deemed appropriate. Six of these papers clearly described the development of different measures so were put forward for quality appraisal.

During the second stage of the search strategy, the remaining 233 empirical papers were reviewed to identify the jealousy measure used within the study. Reference lists were then used to identify key papers reporting the development of the measure and/or the psychometric properties. Papers were excluded if they did not include a measure of jealousy. A further 15 measures were identified, one of which was unpublished and therefore excluded (Survey of Interpersonal Reactions, SIR, Rosmarin, Chambless & Lapointe, 1979). Papers that reviewed existing measures were included (secondary papers; *n*=4). Twenty-four papers reporting the development (*N* = 20) or review *(N* = 4) of self-report jealousy measures were put forward for quality appraisal.

Quality Appraisal

In a review evaluating patient-based outcome measures for clinical trials, Fitzpatrick, Davey, Buxton, & Jones (1998) outlined eight equal and unweighted criteria as important in the assessment of outcome measures (appropriateness, reliability, validity, responsiveness, precision, interpretability, acceptability and feasibility). Within a review and critical appraisal of therapist-patient interaction measures, Cahill et al. (2008) classified the criteria under six broad headings to create a rating tool and provided descriptions of key psychometric and component attributes for each criteria. The rating tool was adapted[1] for use in the present review (Table 1) and was used to assess the measures psychometric qualities. Both key papers and secondary papers were examined for data extraction.

[1] Acceptability, feasibility and precision components taken from data summary sheet devised by Cahill et al. (2008). Term 'divergent' rather than 'discriminant' validity used.

Table 1.
Fitzpatrick criteria adapted from Cahill et al. (2008).

Criteria	Description and key psychometric and component attributes
Reliability	A reliable measure produces consistent results from the same respondents at different times where there exists no evidence of change.
Internal Reliability	Cronbach's alpha
Test–retest reliability	Pearson's correlation
Inter-rater reliability	Expert raters/ Inter-rater agreement
Validity	The extent a measure actually measures the concept that it purports to measure
Face validity	The measure appears (at face value) to measure what it claims to
Content validity	The extent to which the elements within a measure are relevant and representative of the concept measured
Concurrent validity	Where a new measure is administered alongside a pre-existing one and the two correlate
Predictive validity	Predictive power of a measure against another measure
Convergent	Measure converges with other indications of the same concept
Divergent	Measure demonstrates low levels of correspondence with a measure that represents another concept
Responsiveness	Does the instrument detect changes relevant to the patient? Discriminative (between individuals) or evaluative (within an individual across time)
Acceptability (to practitioners and patients)	Is the measure acceptable to users? Number of items Administration method Time taken to complete Reading age Translations Access by ethnic minorities
Feasibility	Is the measure easy to administer and process? Copyright Web or scanning options Training details Administration/process details Support from developers FAQ
Precision	How precise is the measure? Interpretability/scale type Normative data

Note: FAQ = frequently asked questions

Adequate measures should meet, at minimum, basic criteria for internal consistency (reliability) and convergent validity (Cahill et al., 2008; van Saane, Sluiter, Verbeek & Frings-Dresen, 2003). Application of minimum standards excluded nine measures from the psychometric evaluation (Anticipated Sexual Jealousy Scale-Revised, ASJS-R, Buunk, 1997; Communicative Responses to Jealousy Scale-Revised, CRJS-R, Guerrero, Hannawa & Babin, 2011; Facebook Jealousy Scale, FJS, Muise, Christofides & Desmarais, 2009; Jealousy Scale, Tipton et al., 1978; Psychological Maltreatment of Women Inventory – Jealousy Sub-scale, PMWI-J, Kasian & Painter, 1992; Questionario della Gelosia, QUEGE, Marazziti et al., 2010; Questionnaire of Affective Relationships, QAR, Marazziti et al., 2003; Romantic Jealousy Questionnaire, RJQ, Pines & Aronson, 1983; Sexual Jealousy Questionnaire, SJQ, Shrestha, Rees, Rix, Hore & Faragher, 1985). If minimum standards of data could not be extracted from key papers but were available from secondary papers, the measure was included in the final discussion.

The applied rating tool devised by Cahill et al. (2008) does not consider the study design and quality of the methodology. Thus, high validity and reliability values could be extracted from methodologically poor study designs. To account for this, the Manual for Quality Scoring of Quantitative Studies (QualSyst; Kmet, Lee, & Cook, 2004) was used (Appendix A). The QualSyst tool was specifically developed to assess broad types of study design and provides a scoring manual and cut off scores. A liberal cut off was used (below .55) to maximise inclusion of measures. All papers were scored by the author and (5/24) were chosen at random and scored by an independent rater. An interclass correlation analysis was performed assessing reliability. The application of this tool resulted in exclusion of a further three measures

(Anticipated Sexual Jealousy Scale, ASJS, Buunk, 1988; Interpersonal Relationships Scale, IRS, Hupka & Rusch, 1977; Jealousy Coping Scale, JCS, Mcintosh, 1988). Although White's (1981a, 1981b) Chronic Jealousy and Relationship Scale (CJRS) papers did not meet the QualSyst cut off, data from secondary papers with acceptable methodological quality were deemed sufficient for inclusion of this measure. A critical review of excluded measures is included in the discussion. In total, 12 papers were included for discussion. This included eight measures (CJRS, White, 1981a, 1981b; Communicative Responses to Jealousy Scale, CRJS, Guerrero, Anderson, Jorgensen, Spitzberg & Eloy, 1995; Interpersonal Jealousy Scale, IJS, Mathes & Severa, 1981; Jealousy Reaction Scale, JRS, Rich, 1991; Multidimensional Jealousy Scale, MJS, Pfeiffer & Wong, 1989; Short-Form MJS, Elphinston et al., 2011; Romantic Relationships Scale, RRS, Clanton & Kosins, 1983; Self-Report Jealousy Scale, SRJS, Bringle, Roach, Andier & Evenbeck, 1979) and four secondary papers (Hawkins, 1987; Lorena da Costa et al., 2013; Mathes, Roter & Joerger, 1982; White, 1984) .

Data Analysis

Data extracted from the 12 papers were used to critically evaluate each jealousy measure on overall quality. Cahill et al. (2008) provide coding instructions to assess each of the Fitzpatrick criteria. These instructions were developed from guidance provided by the National Health Service (NHS) Centre for Reviews and Dissemination (as cited in Cahill et al., 2008). Table 2 shows the coding instructions used in the current review. The overall reliability rating for each measure was used where available (multiple ratings used for subscales). Validity tests were required to meet significant levels. Where there were multiple validity ratings, the highest of these was referred to in the coding

of the measure and subsequent associations were highlighted in the results section. Construct validity was also assessed; however, as this form of validity is more than a single statistic it was addressed within the discussion of each measure rather than being entered into the results table.

Table 2.

Coding instructions for the quality appraisal of the jealousy measures

Fitzpatrick Criteria	Coding	Explanation
Reliability	Adequate	≥ 0.7
	Partial	≥ 0.5 < 0.7
	Inadequate	< 0.5
Validity	Adequate	≥ 0.50
	Partial	≥ 0.30 <0.50
	Inadequate	< 0.30
Face/Content	Addressed	Type of validity addressed
Responsiveness	Adequate	Significant differences between groups/within individuals across time
	Partial	Non-significant trends between groups/within individuals across time
	Inadequate	Not addressed
Acceptability/ Feasibility/ Precision	Adequate	All components described
	Partially addressed	At least one component described
	Not addressed	No components described

Note: Only evidenced reliability and validity will be coded.

Results

The search process highlighted 24 papers detailing the development and/or assessment of psychometric properties of jealousy measures. The study and methodological quality varied from .15 to 1 on the QualSyst tool (Kemt et al., 2004). Good interrater reliability of quality scoring was found (ICC=.96). A summary of measures can be seen in Table 3 and secondary papers can be seen in Table 4.

key papers identified for quality appraisal.

ure details		Measure development participants	
items *m*	Response scale	N (% female)	Recruitment (country)
d you feel tner were in flirting ıer an?	9-point Likert scale Higher scores indicate higher degree of jealousy	250 (-)	Community (Netherlands)
d you feel tner had	9-point Likert scale Higher scores indicate higher degree of jealousy	200 (50)	Community (Netherlands)

Measure details		Measure development participants		
lumber of items *ample item*	Response scale	N (% female)	Recruitment (country)	M va m
Chronic *low jealous a erson are you enerally?* Relationship *low intense are our feelings of ealousy in your urrent elationship?*	5-point Likert scale Higher scores suggest higher trait jealousy (chronic) and relationship jealousy (relationship)	225 (64)	Student (USA)	Y
0 *When jealous I: lenied it*	7-point Likert scale Higher scores suggest more communicative	200 (61)	Community & Student (USA)	Y

tails		Measure developm participants		Measure details		Measure development participants		
	Response scale	N (% female)	Recruit (country	umber of items *ample item*	Response scale	N (% female)	Recruitment (country)	Mir vali me
	6-point Likert scale Higher scores suggest higher jealousy	-	-	2 */hen jealous: I ecame silent*	7-point Likert scale Higher scores suggest more communicative responses to jealousy	793 (62)	Student (USA)	N
l get				7 *low likely are you monitor your artner's activities n Facebook?*	7-point Likert scale Higher scores suggest higher Facebook jealousy	308 (75)	Student (Canada)	N
	-	101 (-)	Studen (USA)					

Measure details		Measure development participants		
mber of items *mple item*	Response scale	N (% female)	Recruitment (country)	Mi va me
S I *action to jealousy* *oking situation* *(pressing* *satisfaction)– feel* *e getting even* S II *action to jealousy* *oking situation* *ntributing more) –* *y more cards or* *ts for my partner*	9-point Likert scale Higher scores indicate higher reactions	50 (50)	Community (USA)	Y
	5-point Likert scale Higher scores	241 (59)	Student (USA)	N

Measure details		Measure development participants		
Number of items *Sample item*	Response scale	N (% female)	Recruitment (country)	M va m
24 *3x eight item subscales – I suspect X may be attracted to someone else*	7-point Likert scales Higher scores indicate higher jealousy	178 (51)	Community & Student (Canada)	Y
17 *3 subscales- I question X about their telephone calls*	7-point Likert scales Higher scores indicate higher jealousy	326 (65)	Community & Student (Australia)	Y
7	5-point Likert scale	1625	Student	N

Measure details		Measure development participants		
Number of items *Sample item*	Response scale	N (% female)	Recruitment (country)	M va m
30 *Do you avoid talking about betrayal?*	4-point Likert scale Higher scores indicate more jealous behaviours in response to jealous thoughts	400 (-)	Student & Clinical (Italy)	N
30 *Worried about being abandoned*	4-point Likert scale Higher scores indicate higher jealousy on the 5 jealousy dimensions	500 (63)	Student (Italy)	N
30 *Have any of your relationships*	7-point Likert scale Higher scores indicate higher jealousy on the 5	103 (66)	Community (USA)	N

ure details		Measure development participants	
of items *tem*	Response scale	N (% female)	Recruitment (country)
orry that ny partner er man	5-point Likert scale Higher scores indicate higher jealousy	251 (66)	Student & Clinical (USA)
convinced tner is	3-point Likert scale Higher scores indicate higher jealousy	100 (26)	Clinical (UK)

Measure details		Measure development participants		
nber of items *mple item*	Response scale	N (% female)	Recruitment (country)	Mi va me
w would you feel our partner rked closely with other (of opposite)	7-point Likert scale Higher scores indicate higher jealousy	163 (53)	Student (Netherlands)	N
u find out your ouse is having an air	9-point Likert scale Higher scores indicate higher jealousy	89 (58)	Student (USA)	Y

d Sexual Jealousy Scale; ASJS-R = ASJS – Revised; CJRS = Chronic Jealousy a
Responses to Jealousy Scale; CRJS-R = CRJS- Revised; FJS = Facebook Jealo
cale; IRS = Interpersonal Relationships Scale; JCS = Jealousy Coping Scale; JR
nsional Jealousy Scale; PMWI-J = Psychological Maltreatment of Women Scale -
Affective Relationships; QUEGE = Questionnaire della Gelosia; RJQ = Romantic
nships Scale; SJQ = Sexual Jealousy Questionnaire; SJS = Sexual Jealousy Sca

papers.

r details		Measure r	Secondary paper details		Measure review participa	
	Main aims	N (% female)	sures reviewed	Main aims	N (% female)	Recruitme (country)
	Assess relationship among three types of jealousy scale (dispositional, rational, phenomenological)	315 (55)	antic Differential hnique S	Assess whether the measures could identify the theorised group differences between heterosexual and homosexual males	194 (0)	Communit (USA)
			R	Translation of measures into Portuguese	122 (-)	Communit Clinical (Brazil)
			S			

elationship Scales; IJS = Interpersonal Jealous
sonal Reactions SRJS = Self-Report Jealousy

Following application of minimum quality standards (validity, reliability and QualSyst), 12 papers concerning eight measures were examined for data extraction against the Fitzpatrick et al. (1998) quality criteria using the adapted rating tool from Cahill et al. (2008). These results are shown in Table 5. An overview of measures is provided below followed by the results of psychometric appraisal.

Overview of Measures

CJRS. The scales were developed by giving large student samples items with face validity, which were then subject to factor analysis. The Chronic Jealousy scale has six items (rated on a 5-point Likert scale) measuring the tendency to experience chronic jealousy. The Relationship Scale is identical in form; however, items measure how jealous a person is in current relationships. Secondary papers by White (1984) and Mathes et al. (1982) were also used for data extraction and review of the CJRS.

CRJS. CRJS items were developed by asking a majority student sample to identify their communicative responses to jealousy. Following extensive factor analysis, six factors emerged accounting for 61.6% of the variance: negative affect expression, integrative communication, distributive communication, active distancing, avoidance/denial, violent communication/threats. The CRJS examines communicative responses and consists of 60 items (rated on a 7-point Likert scale).

IJS. The IJS measures jealousy in current relationships. Face-valid items were given to students in dating relationships. Following item analysis, 28 items were retained for the scale (using a 9-point Likert scale). Data extracted from three secondary papers were also used (Hawkins, 1987; Lorena da Costa et al., 2012; Mathes et al., 1982).

JRS I&II. The JRS I and II measures jealous reactions (14 items). The JRS I concerns jealous behaviours related to attacking a partner (7 items), and the JRS II reflects behaviours that attempt to protect against relationship loss (7 items). The format of the response items were developed from previous research and checked against the two-factor model of jealousy by expert raters.

MJS. The MJS measures jealous cognitions, emotions and behaviours. Face valid items were developed by authors and research students. Each sub-scale consisted of eight items and seven-point rating scales. The factor structure, validity and reliability of the scale were tested using broad demographic samples.

SF-MJS. The SF-MJS was developed following a psychometric review of the MJS. The three-factor structure of the original MJS was supported in community and student samples; however, due to cross-loadings and substantial covariance, seven items were removed to create the 17-item short version.

RRS. The RRS consists of 15 hypothetical situations that might provoke jealousy (5-point rating scale). In addition, the scale has 13 statements where responses are rated on how much one agrees/disagrees (5-point scale). Uniquely, the RRS moved away from assessing the reaction to betrayal or relationship loss and included a range of situations where threat was more ambiguous and outcome more dependent on interpretation by individuals.

SRJS. The SRJS measures how people evaluate a variety of jealousy-evoking situations and how intensely they expect to react. Students described jealousy-triggering incidents across the life course and content analysis uncovered jealousy-evoking situations (dating/spouse relations, home/family situations, work situations, friends and school situations) that were used to

produce a 20-item scale (9-point Likert scale). Factor analysis revealed four jealousy factors (social, sexual, family & work). The scale can be used as a dispositional unidimensional measure of jealousy, or subscales used as required.

Psychometric Appraisal of Self-report Jealousy Measures

Validity and reliability. Reliability and validity of each jealousy measure shall be discussed in turn. All of the jealousy measures demonstrated adequate reliability in the form of internal consistency (α>.70). The only exception to this was the violent communication/threats subscale (α=.58) of the CRJS. All included measures showed evidence of face validity and appeared to measure the construct of jealousy.

CJRS. Although there is some evidence of convergent validity for both scales, there is also high correlation between the scales (r=.71), questioning the orthogonal nature of the two concepts. In line with established theoretical constructs of jealousy, the scales converged with feelings of inadequacy (Females only: Chronic (C), r = .34, Relationship (R), r = .39). There was also positive associations between the scales and feelings of valuing sexual exclusivity (Male: C, r = .32, R, r = .30; Female: C, r = .19). Chronic and relationship jealousy were related to feelings of putting more effort into a relationship relative to a partner (Males: C&R, r = .49; Female, C, r = .19, R, r = .18). Convergent and divergent validity is supported further by the secondary papers. Mathes et al. (1982) found the CJRS correlated with other measures of jealousy (r> .39), but were unrelated to measures of romantic love, extraversion and dependency. White (1984) found positive associations between the scales and the SRJS (Male: C, r = .63, R, r = .52; Female: C, r = .40, R, r = .27) and the SIR (Male: C, r = .62, R, r = .71; Female: C, r = .45, R, r = .56). There was

no relationship between the scales and Machiavellianism providing some evidence of divergent validity. The Relationship Scale showed some evidence of content validity, the first principle component accounted for 54.3% of the variance, suggesting a unidimensional scale.

CRJS. The CRJS correlated to other measures of jealousy in predictable ways suggesting convergent validity (data omitted from key paper). As hypothesised, the CRJS showed a stronger correlation to the JRS expression jealousy scales (effect sizes small to large) in comparison to the MJS experience scales (effect sizes small to medium), so evidencing divergent validity. Validity results were supported as regression analysis showed that CRJS responses were stronger predictors of the expression measure (JRS) in comparison to the experience measure (MJS). Factor analysis demonstrated six clear factors representing jealous responses and supporting content validity. The combined validity results suggest the CRJS shows construct validity as an assessment of jealous expression.

IJS. Convergent validity was demonstrated through positive associations with romantic love (Male: r = .47; Female: r = .41) and insecurity (Female: r = .26) and negative associations with the measure of separate identities (couples who cultivated separate identities were less vulnerable to jealousy, r> -.27). Divergent validity was demonstrated through insignificant correlations between the IJS and measures of liking and self-esteem. Secondary papers also supported the construct validity for the IJS. The IJS correlated positively (r > .53) with two measures of jealousy (Hawkins, 1987). For women, the IJS correlated with five other jealousy measures including the CJRS (r = .43) and the SRJS (r = .49). The pattern of convergence was less clear for men, with only three jealousy scales correlating positively with the IJS (r = .32-.59; Mathes

et al., 1982). Items from all six jealousy scales were factor analysed and the IJS factored most highly on a factor representing ‘pure’ jealousy, supporting its content validity as a general measure of jealousy. Finally, Hawkins (1987) assessed whether the IJS could identify theorised group differences between heterosexual and homosexual men (heterosexual men experiencing higher jealousy). There were significant differences between the two groups when jealousy was measured with the IJS supporting construct validity. The IJS also differentiated between ‘excessive jealousy’, ‘pathological love’ and healthy participants (Lorena da Costa et al., 2012).

JRS I&II. The JRS scale items have demonstrated inter-rater reliability (p = .045) from expert raters. The correlation between the two scales was insignificant, suggesting the scales are orthogonal. Factor analysis produced two clear factors representing each subscale supporting content validity. The JRS-I correlated significantly with an unpublished measure of jealousy (Males & Females, r = .42), suggesting convergent validity. However, the JRS-II did not converge with this measure and might be measuring behaviours that are not typically associated with jealous reactions (e.g. ‘tell my partner how much I need them’). Cross-validation of the scales between dating couples showed moderate correlations (JRS-I, r = .33; JRS-II, r = .36) supporting the construct validity. This suggests the JRS is more than just the examination of fleeting individual responses, as an individual’s self-assessment of jealousy was validated by their partner.

MJS. The three-factor structure of the MJS was confirmed over three studies consisting of broad community and student samples, evidencing content validity. Adequate test-re-test reliability over 2 months was demonstrated by the cognitive (r = .75) and emotional (r = .82) subscales. The behavioural scale had

inadequate test-re-test reliability (*r* = 0.34), suggesting that behavioural jealousy is more situationally dependent when reporting on current and past relationships. Positive correlations between the three subscales and the CJRS (Cognitive (Co), *r* = .38; Emotional (E), *r* = .53; Behavioural (B), *r* = .56) provides evidence of concurrent validity. In support of convergent and divergent validity, the three components showed different patterns of correlation with the variables of happiness (E, *r* = -.24; B, *r* = -.17), love (Co & E, *r* = -.20) and liking (Co, *r* = -.37; E, *r* = -.15; B, *r* = -.43). Emotional and behavioural jealousy were negatively related to happiness as expected (convergence); however, cognitive jealousy was not related to happiness (divergence). The MJS subscales correlated positively with the SRJS sexual jealousy subscale to varying degrees (Co, *r* = .27; E, *r* = .74; B, *r* = .52). The research supports the construct validity of the multidimensional approach of the scale.

SF-MJS. The three-factor structure (cognitive, emotional & behavioural) was evidenced using exploratory and confirmatory factor analysis, supporting content validity. Positive associations between the SF-MJS and the Chronic Jealousy Scale (Co, *r* = .37; E, *r* = .50; B, *r* = .45) provide evidence for concurrent validity, supported further by positive associations between the SF-MJS and the anxiety subscale of the Experiences in Close Relationships Questionnaire (Brennan, Clark & Shaver, 1998; Co, *r* = .34; E, *r* = .40; B, *r* = .49). The emotional and behavioural subscales of the SF-MJS correlated with a measure of emotionality (E, *r* = .33; B, *r* = .22); however, cognitive jealousy did not, providing support for divergent validity of the cognitive subscale only.

RRS. The RRS demonstrated adequate test-re-test reliability (*r* = .82) over two weeks. However, the generalisability of reliability was problematic as the sample from which this is drawn is unclear. The RRS correlates positively

with another measure of jealousy (IRS, *r* = .69) providing evidence of convergent validity. However, within community and student samples the variable that most strongly associated with jealousy was social desirability. Thus, people who gave less socially desirable answers admitted more jealousy. This finding suggests that jealousy is challenging to assess by self-report, even if the threat posed in the measure is subtle.

SRJS. The SRJS demonstrated adequate test-re-test reliability (two weeks, *r* = .93). Content validity was supported by the method of generating scale items and the clear four-factor structure. Convergent validity was evidenced by associations with androgyny, self-depreciation, self-esteem and life dissatisfaction (no values reported in key paper). The SRJS did not correlate with measures of social desirability or Machiavellianism evidencing divergent validity. Despite requiring further evidence, the pattern of results supports the construct validity of the scale.

Responsiveness. None of the studies included a longitudinal element and therefore did not assess responsiveness (ability to detect change over time).

Acceptability. All included measures achieved two of the listed component attributes for acceptability criteria (Table 1) by reporting the number of items and administration method (self-report). The measures lacked descriptions on how much time they take to complete, recommended reading age, standard translations and access by ethnic minorities. The absence of acceptability components reduces a measures potential in being adapted for use in service or research settings, as ‘user-friendliness’ cannot be established from the published information (Cahill et al., 2008).

Feasibility. Feasibility ranged from ‘not addressed’ (no components present, CJRS; CRJS; IJS) to ‘partially addressed’ (at least one component present, JRS I&II; MJS; RRS; SF-MJS; SRJS) with the maximum of one component attribute identified, again reducing the ‘user-friendliness’ and service implementation of included measures. However, the measures all had simple scoring systems that did not require extensive training of clinicians. The CRJS is the longest measure identified in the review (60 items) and poses a burden for participants completing it and clinicians scoring it. The key paper for the SRJS was not easily available. The CRJS and the IJS do not include a copy of the measure in the key paper, reducing feasibility. For the CJRS, JRS and SF-MJS, although full copies of the measures were not included in key papers, enough information (scale items, instructions) was included to form a copy of the measure if necessary. Lack of access to measures increases the burden on clinicians and researchers. The MJS, SRJS and RRS all include a full copy of the measure in the key paper increasing the clinical and research utility. All measures are free to use.

Precision. All included measures met one of the component attributes for this criterion as a clear description of the scale type (Likert type scale) was provided. Fitzpatrick et al. (1998) suggests a seven point Likert scale (CRJS; MJS; SF-MJS) offers more precision than a five-point scale. There is minimal evidence for increased precision beyond a seven-point scale. Normative data (second component attribute) facilitates interpretation of scores and improves precision. None of the included measures provided normative data. Due to the challenges of defining and measuring jealousy (White, 1984), representative population data for this emotion are not yet available.

: *Criteria (included jealousy measures)*

Reliability		Validity	Responsiveness	Acceptability
Internal consistency	Test-re-test			
0.81	-	Face = Addressed Conv = Partial Div = Adequate	Inadequate	Partially addressed (2)
-	-	Conv = Adequate Div = Adequate	Inadequate	-
0.83	-	Conv = Partial Div = Adequate	Inadequate	-

	Reliability		Validity	Responsiveness	Acceptability
	Internal consistency	Test-re-test			
	0.83	-	Face = Addressed Cont = Addressed Conv = Partial Div = Adequate	Inadequate	Partially addressed (2)
t	-	-	Conv = Adequate Div = Adequate	Inadequate	-

Reliability		Validity	Responsiveness	Acceptability
Internal consistency	Test-re-test			
Active distancing = 0.83 Negative affect expression = 0.82 Integrative communication = 0.83 Verbal aggression = 0.83 Avoidance/ denial = 0.75 Violent communication/	-	Face = Addressed Cont = Addressed Conv = Adequate Div = Adequate	Inadequate	Partially addressed (2)

Reliability		Validity	Responsiveness	Acceptability
Internal consistency	Test-re-test			
0.92	-	Face = Addressed Conv = Partial Div = Partial	Inadequate	Partially addressed (2)
Heterosexual men = 0.92 Homosexual men = 0.92	-	Conv = Adequate	Inadequate	-
-	-	Cont = Addressed Conv = Adequate Div = Adequate	Inadequate	-

Reliability		Validity	Responsiveness	Acceptability
Internal consistency	Test-re-test			
JRS-I = 0.85 JRS-II = 0.88	-	JRS-I Face = Addressed Cont = Partial Conv = Adequate	Inadequate	Partially addressed (2)
Cognitive = 0.92 Emotional = 0.85 Behavioural = 0.89	2 months Cognitive = 0.75 Emotional = 0.82 Behavioural = 0.34	Face = Addressed Cont = Addressed Conc = Adequate Conv = Adequate Div = Partial	Inadequate	Partially addressed (2)
Cognitive = 0.77 Emotional = 0.81 Behavioural	-	Face = Addressed Cont = Addressed Conc = Adequate Conv = Adequate Div = Adequate	Inadequate	Partially addressed (2)

	Reliability		Validity	Responsiveness	Acceptability
	Internal consistency	Test-re-test			
	0.90	2 weeks 0.82	Face = Addressed Conv = Adequate	Inadequate	Partially addressed (2)
	.93	2 weeks .93	Face = Addressed Cont= Addressed Conv = Partial Disc = Partial	Inadequate	Partially addressed (2)

ealousy and Relationship Scales; CRJS = Communicative Responses to Jealous
cale; JRS I&II = Jealous Reaction Scale I&II; MJS = Multidimensional Jealousy

Discussion

This paper systemically reviewed the quality of self-report jealousy measures through the examination of psychometric attributes. Papers were excluded from the final assessment if they did not reach the minimum reliability and validity criteria, and/or if they did not reach minimum quality for methodological and study design. Measures were coded against Fitzpatrick et al's. (1998) criteria for assessment of outcome measures using Cahill et al's. (2008) rating tool. Generally, measures showed poor psychometric foundations with limited validity. Validity evidence often only covered convergent and divergent validity and there was inadequate criterion validity, responsiveness, acceptability, feasibility and precision across the measures. Overall, the MJS

and SF-MJS showed the most promising psychometric properties. They have clear factor structures that have emerged in multiple studies with different samples of participants, the subscales show excellent reliability and the MJS has good stability (i.e. test-re-test reliability). There is good evidence for convergent and divergent validity and evidence is building towards concurrent validity. The acceptability, feasibility and precision of the measures could be improved. Both scales would benefit from further research that tests responsiveness in different population samples.

When considering other measures, the IJS was included for review in three out of four secondary papers; resulting in good convergent and divergent validity evidence across a number of theoretical concepts. However, the IJS did not always correlate as expected with related measures and has produced some gender difference results not easily explained by current theory. The IJS would benefit from further factor testing to examine its underlying structure. The CRJS had acceptable psychometric foundations; however, some important quantitative data are missing from the paper and the scale seems better suited to understanding communicative responses to jealousy, rather than as a general measure of jealousy. The CJRS provided a good basis for the theoretical development of jealousy as a multidimensional concept. Nevertheless, modern developments of this conceptualisation (MJS; SF-MJS) now offer better multidimensional measurement. The SRJS paper does not report quantitative data concerning validity and refers to unpublished papers for this information, making the psychometric assessment of the SRJS challenging. The JRS and the RRS both lack evidence of divergent validity, which reduces their psychometric quality. For example the JRS I that purports to measure reactions that protect against loss of self-esteem by attacking the partner could

be measuring the concept of anger. Without sufficient divergent and convergent validity, this overlap cannot be disproved. The JRS-II also lacks convergent validity evidence.

Critique of Excluded Measures

Application of minimum standard validity and reliability resulted in nine measures being excluded. On critical examination of these papers, five completed factor analysis but failed to provide sufficient details of reliability/validity (CRJS-R; FJS; JQ; PMWI-J; QUGE), three were measures developed specifically as part of an empirical study and did not address issues of reliability/validity (ASJS-R; QAR; SJQ) and one was a complex scale assessing many factors of jealousy, that did not address reliability (RJQ). The inherent challenges in defining jealousy (White, 1984) and lack of epidemiological data (Ecker, 2012), results in measure development that appropriately represents the underlying factors of this complex emotion, but is yet to reach the stage of validation against known theory and pre-existing measures. Measures designed as part of empirical studies had limited clinical or research usefulness due to being designed to answer a specific question, reducing adaptability.

Methodological minimum standards (Qualsyst tool) resulted in a further three measures being excluded (ASJS; IRS; JCS). Common reasons for these measures reduced scores were: lack of information about participant selection, lack of demographic description of included participants and no information regarding uncertainty of estimates within results (e.g. confidence intervals). The assessment of methodological quality is essential as poor design, conduct and analysis can result in increased errors and bias within measures (Kmet et al., 2004).

Critique of Included Measures

Measures included for review share some methodological limitations such as the lack of reported ethnicity of participants (e.g. only the CRJS, reported that 80.4% of participants were white). There was also a distinct lack of clinical samples; exceptions included Clanton and Kosins (1983) who used a nonpsychotic psychotherapy outpatient sample and Lorena da Costa et al's. (2013) translation study, which included people diagnosed with excessive jealousy. There were also examples of potential selection bias, such as financially rewarding participants (JRS), offering course credit in exchange for participation (CJRS; CRJS; IJS; Mathes et al., 1982; White, 1984) and relying on volunteers (RRS; SF-MJS; MJS; Hawkins, 1987; Lorena da Costa et al., 2013). The research was conducted in the USA, Canada and Australia, which raises questions about the applicability of measures to particularly non-western cultures.

Overall, the lack of longitudinal designs and test-re-test analysis questions whether the measures are capturing state jealousy at one moment in time or trait jealousy. Rich (1991) partially addressed this by cross validating the JRS within couples, finding moderate correlations. Positive correlations between couples on the same measure of jealousy suggest that there is a relationship component to jealousy and self-report responses are not just measuring an individual component of jealousy at one point in time. White (1984) examined couple-intercorrelations in four jealousy measures, finding that the CJRS showed excellent intercorrelation. The other measures, including the SRJS showed weaker evidence of convergence. It is unclear from current research if couples with similar interpersonal styles (including higher jealousy)

are more likely to form a relationship or whether high jealousy in one person affects jealousy in their partner.

The current review did not examine the extensive research available whereby the measures have been used as part of empirical study. Thus, the evidence needed over time to establish whether a measure is well validated is not examined. Assessment of concurrent validity is therefore challenging, as although measures of jealousy have been completed simultaneously in some of the key and review papers, a ‘gold-standard’ well-validated jealousy measure is yet to be established. The statements concerning concurrent validity made by the authors of the MJS and the SF-MJS should therefore be interpreted with caution.

Finally, reliance on student populations in the understanding and assessment of jealousy (see Tables 3 & 4) reduces the generalisability of results and reduces the theoretical understanding of this complex social emotion (DeSteno, 2010).

Despite limitations, several strengths of the included papers should be noted, such as testing for socially desirable responding (JRS; CJRS; White 1984), using participants regardless of relationship status (MJS; JRS) and developing multidimensional measures of jealousy (SF-MJS; CRJS; MJS; JRS).

In regards to practical implications, none of the measures performed well on the criteria of acceptability and feasibility. This is likely due to the current stage of conceptualisation and theoretical understanding of jealousy. In addition, the length of a measure, its completion time and reading age should not be assigned the same importance as for outcome measures selected for a controlled clinical trial, where high response rates are essential (Cahill et al., 2008).

Future Research

Clear areas for future research have emerged from this review. Firstly, measures of romantic jealousy would benefit from further validation. There is a distinct lack of divergent and criterion (predictive & concurrent) validity evidence, use of clinical samples and samples with diverse ethnicity. Overall, these gaps reduce the generalisability and clinical utility of the measures. A systematic review of all empirical studies that have utilised jealousy measures could fortify the reliability and validity of existing measures.

Secondly, there is opportunity to develop further measures of romantic jealousy focused on the multidimensional nature of jealousy and built upon the concepts of thought, emotion and behaviour. New measures should focus on becoming assessment or outcome tools with clinical utility. Existing multidimensional measures that show adequate psychometric properties, such as the MJS or the SF-MJS can be used to validate new measures of jealousy. To be clinically useful, measures should be able to assess jealousy along a continuum and identify when jealousy is occurring at pathological levels. The issue of socially desirable responding should also be considered in future research. Jealousy is viewed as a negative emotion, signalling insecurity or personality defect (Clanton, 1981) and therefore self-report measures are highly susceptible to bias reporting (Clanton & Kosins, 1983). Measures should find innovative ways to reduce this effect.

Clinical Implications

This review highlights the distinct lack of well-validated jealousy measures that can be used in clinical practice. Despite the wide variety of different jealousy measures, clinicians do not have access to validated or standardised measures of jealousy. This might lead to under-assessment of

pathological jealousy and lack of treatment options (and risk management) for people accessing services for help with feelings of jealousy. Without acceptable measures, clinicians are also unable to measure levels of jealousy before, during and after treatment to track clinical change.

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Note: *studies identified from search method

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Appendix A

QualSyst Quality Appraisal Checklist (Quantitative Studies)

Criteria		**Yes (2)**	**Partial (1)**	**No (0)**	**N/A**
1	Question/objective sufficiently described.				
2	Design evident & appropriate to answer study question.				
3	Subject selection described and appropriate				
4	Subject characteristics sufficiently described				

5	If random allocation to treatment group possible, is it described.				
6	If interventional and blinding of investigators to intervention was possible, is it reported?				
7	If interventional and blinding of subjects to intervention was possible, is it reported?				
8	Outcome measures well-defined and robust to measurement bias.				
9	Appropriate sample size.				
10	Analysis described and appropriate				
11	Some estimate of variance is reported for main results/outcomes.				
12	Controlled for confounding				
13	Results reported in sufficient detail.				
14	Do the results support the conclusions?				

Scoring Instructions for summary score:

- **Total sum =** (number of '*yes*' * 2) + (number of *'partials'* * 1)
- **Total possible sum** = 28 – (number of '*N/A'* * 2)
- **Summary score** = total sum / total possible sum

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Section Two: Research Report

Design, validation and testing of the Jealousy Provocation Measure.

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Abstract

Objectives: Jealousy is a complex and therefore difficult emotion to assess. This study concerns the development and evaluation of the Jealousy Provocation Measure (JPM). The JPM assesses behavioural responsivity to an evolving and jealousy-provoking scenario, grounded in attachment theory.

Design: Cross-sectional online survey design.

Methods: Participants (*n*=720) were recruited from community, student and clinical (Obsessive Compulsive Disorder; OCD) samples and completed the JPM and measures of jealousy, attachment, OCD and impulsivity.

Results: The JPM had good internal consistency and adequate convergent and divergent validity. Increased jealousy was associated with increasing behavioural reactivity. Participants with OCD showed significantly higher levels of jealousy and behavioural reactivity. Increased reactivity at low levels of relationship threat were found in both participants with OCD and those with anxious attachment.

Conclusions: The JPM is an innovative and effective method of assessing jealousy. The measure holds promise in the assessment of pathological jealousy and could function as an outcome measure.

Practitioner Points

- The JPM can be used as part of assessment of jealousy in clinical settings.
- Assessing behavioural reactivity is an important facet of the global assessment of morbid jealousy and particularly informs risk assessment.

- Assessing attachment style appears important in the assessment of jealousy.
- Establishing presence of co-morbidity with jealousy with formal OCD should be commonplace.

Introduction

Jealousy in the context of romantic relationships has been the focus of substantial research and investigation over the past 30 years (Elphinston, Feeney & Noller, 2011). Romantic jealousy is a complex mix of thoughts, feelings, and behaviours that occur when an individual perceives a threat to the existence or quality of their romantic relationship (White, 1981). Whilst threats

may be real or imaginary, both involve potential or actual romantic attraction between one's partner and a rival (Kingham & Gordon, 2004).

Within the existing research, a number of problem behaviours and clinical issues associated with romantic jealousy have been found: verbal and physical abuse (e.g. Barnett, Martinez, & Bluestein, 1995), alcoholism (e.g. Michael, Mirza, Mirza, Babu, & Vithayathil, 1995), low self-esteem (e.g. Guerrero & Afifi, 1999), relational dissatisfaction (e.g. Guerrero & Eloy, 1992) and dependency (e.g. Ellis, 1996). Jealousy can also lead to secondary psychiatric conditions, such as anxiety and depression (Mathes, Adams, & Davies, 1985).

Jealousy is labelled as pathological (morbid) when it exceeds levels regarded the 'norm' within a specific culture or society (Mazzariti et al., 2003). Classification of pathological jealousy within the Diagnostic and Statistical Manual of Mental Disorders- 5, (DSM-5; American Psychiatric Association; APA, 2013) occurs under (i) Delusional Disorder-Jealous Type or (ii) an obsessive-compulsive phenomenon/psychopathology. For classification of delusional jealousy, the individual must experience delusions concerning the fidelity of their long-term partner (ego syntonic). Schizophrenia, drug/alcohol abuse or physical illness must be ruled out as causes of the delusions (Mullins, 2010). Jealousy as an obsessive-compulsive psychopathology involves the non-delusional preoccupation with a partner's perceived infidelity; however, the intrusive thoughts are recognised as ego dystonic; the individual recognises them as unpleasant and irrational (Agarwal, Biswas & Agarwal, 2007; Agarwal, Sharma & Biswas, 2008; Cobb & Marks, 1979; Ecker, 2012; Mullins, 2010; Parker & Barrett, 1997).

Jealousy is a multidimensional concept and therefore challenging to measure (White, 1984). In addition, the transition point between non-pathological and pathological jealousy is difficult to pinpoint (Mazzariti et al., 2003; Mullen & Martin, 1994). The measurement of cognitive and behavioural dimensions of jealousy are seen as useful in the identification of pathological jealousy (Elphinston et al., 2011; Pfeiffer & Wong, 1989).

Jealous Behaviour in Romantic Relationships

The extent and range of jealousy-driven behaviours are often seen as the defining pathological characteristic of morbid jealousy (Marazziti et al., 2003). Behaviours can vary from low level checking of a partner's whereabouts, to going through partner's possessions, to more extreme behaviours such as stalking and consistent aggressive interrogation of the partner (Mullins, 2010).

There is minimal empirical research providing useful criteria to define the transition from non-pathological to pathological jealous behaviour. Marazziti et al. (2003) compared obsessive-compulsive disorder (OCD) outpatients experiencing obsessional jealousy (*n* = 14) with a student sample (*n* = 400). The jealous sample spent more time obsessing (1-4 hours/day), had more impaired relationships, sought more reassurance and used checking behaviours to limit their partner's freedom.

Mullen and Martin (1994) found further barriers to distinguishing between non-pathological and pathological jealous behaviour. In a community sample (*n* = 600), 19% of women and 15% of men considered romantic jealousy a significant contributor to their relationship problems. Over half-reported cross-examining partners, checking their partner's location and 15% reported that physical violence had occurred due to jealousy. Such results indicate that

jealous behaviours used as markers for pathological jealousy are not clear-cut, and warrant further investigation and definition.

Jealous Behaviours and Attachment

Attachment theory (Bowlby, 1988) and subsequent attachment style differences have been posited to explain the variation in the experience and expression of romantic jealousy (Guerrero, 1998; White & Mullen, 1989). Guerrero (1998) proposed that jealousy produces a distressing/threatening situation likely to activate the attachment system. The creation of relational uncertainty leads an individual to evaluate and react in ways consistent with their mental models of the self and others (internal working models). Attachment exerts influence on how much an individual experiences jealousy (Hazan & Shaver, 1987), and explains variation in individual experience and expression of jealousy (Sharpsteen & Kirkpatrick, 1997).

The three main attachment dimensions (secure, anxious and avoidant) create differing reactions to and experiences of jealousy (Collins & Read, 1990; Guerrero, 1998; Hazan & Shaver, 1987; Knobloch, Solomon & Cruz, 2001; Marshall, Bejanyan, Di Castro & Lee, 2013; Radecki-Bush, Farrell & Bush, 1993; Sharpsteen & Kirkpatrick, 1997). Anxious attachment (the preoccupied and fearful styles) is associated with increased expression of jealousy, increased surveillance behaviour, and higher emotional reactivity to jealousy-provoking stimuli (Collins & Read, 1990; Guerrero, 1998; Knobloch et al., 2001; Marshall et al., 2013). The high level of emotional arousal, triggered by jealousy is felt intensely and results in clinginess, a preoccupation with maintaining the relationship, surveillance and hyper-alertness to perceived relationship threats (Guerrero, 1998). Anxiously attached individuals ‘protect’ their relationship by

suppressing feelings of anger towards their partner, for fear of upsetting or pushing their partner away (Sharpsteen & Kirkpatrick, 1997).

Avoidant attachment (dismissive style) is associated with reduced feelings of jealousy and less surveillance behaviour. The attachment system is actively suppressed to avoid negative affect. Blame and anger are often directed at the rival and avoidantly attached individuals often seek less social support (Guerrero, 1998; Radecki-Bush et al., 1993; Sharpsteen & Kirkpatrick, 1997).

Securely attached individuals experience less jealousy, fear, distress, anger, shame, and guilt compared to the other attachment styles (Radecki-Bush et al., 1993). They are more confident in expressing their anger towards their partner without the fear of losing the relationship. Secure attachment is also associated with less reactivity, more control and higher esteem after the discovery of infidelity (Sharpsteen & Kirkpatrick, 1997). The manner in which the different attachment styles react over time to evolving jealousy triggers is currently unknown.

Impulsivity in Jealous Behaviour

Dysfunctional impulsivity concerns acting without appropriate consideration of the consequences (Dickman, 1990). However, the role of impulsivity in jealousy lacks an evidence base. The existing impulsiveness literature has examined the impact of response inhibition on dysfunctional impulsivity (Aker & Hoel, 2009). Dysfunctional impulsivity highlights the ‘tendency to act with little forethought despite the fact that this frequency leads the individual into difficulties’ (Aker & Hoel, 2009, p6.).

A lack of self-regulation and response inhibition has been linked to impulse control disorders, such as OCD (Lochner & Stein, 2006). When

comparing descriptions of self-regulation in OCD (trying to stop unwanted thoughts, oppressing emotions, resisting impulses and desires and reducing negative affect) similarities with descriptions of pathological jealousy are present (a preoccupation with infidelity, confirmatory/checking behaviours, overwhelming distress, cross-examination, and violence). Based on the existing literature, impulsivity may play a role in jealous behaviour. However, to date the association between jealousy and impulsivity has not been examined.

Measurement of Jealousy

Ideally, jealousy should be studied in vivo to capture its emergent properties and multidimensional nature (De Steno, 2010). However, this is time-consuming, resource-heavy, and complicated to achieve. Barriers to measuring jealousy in vivo have resulted in the development of various forced choice self-report measures. Early attempts to measure the construct of jealousy focused on antecedent conditions and correlates (Bringle, Renner, Terry, & Davis, 1983; Buunk, 1982; White, 1981). Attempts have also been made to determine the amount of jealousy a person experiences (Mathes & Severa, 1981). However, jealousy scales require participants to be currently in a romantic relationship to rate their current experience. This form of self-report measurement of jealousy is also highly susceptible to response bias, due to issues of socially desirable responding (Bauerle, Amirkham and Hupka, 2002; Furnham & Henderson, 1982).

This thesis concerns a measure of jealousy that uses everyday scenarios designed to trigger jealousy. Responses were not dependent on the respondent being in a relationship as the proposed measure moved away from asking people to rate their emotional experience of jealousy (e.g. *'How upset would you be if…?')*, and rather examines behavioural responses to an evolving (but

every day) scenario. The measure aimed to be easy to complete, based on everyday interactions and hopefully more robust to response bias. The scenario was designed to have increasing jealousy provocation potential at each stage of the measure over time. Behavioural responses were grounded in attachment style differences in the experience and expression of jealousy (Guerrero, 1998). To examine response variability, each stage incorporated different levels of relationship treat. Increased jealousy-provocation within the scenarios attempted to 'trigger' participant's attachment systems. Overall, increasing threat within the scenarios allowed the examination of the 'tipping point' between non-pathological jealous reactions versus pathological reactions to jealousy.

Aims

The main aims of the study were;

1. To develop and test a scenario-based jealousy measure: The Jealousy Provocation Measure (JPM).
2. To identify differences in the behavioural choices made by jealous and non-jealous participants from community, student and clinical (OCD) samples.
3. To investigate the speed of decision-making to jealousy prompts in real time.
4. Explore the influence of attachment style on JPM behavioural responding.
5. Define the behavioural choices of differing attachment styles when faced with increasing jealousy provocation.

Hypotheses

1a. The JPM will demonstrate convergent validity with pre-existing jealousy measures and divergent validity from measures of attachment, OCD and impulsivity. The measure will also demonstrate adequate internal reliability.

1b. Jealousy (as measured by the Short Form- Multidimensional Jealousy Scale; SF-MJS, Elphinston et al., 2011) will be associated with higher scores on the JPM, indicating behavioural choices that are more reactive to jealousy provocation.

2. Participants with OCD (clinical group) will report more jealousy (SF-MJS) and will have higher JPM scores compared to the non-clinical participants.

3. Participants reporting higher jealousy (SF-MJS) will have quicker response times when making decisions on the JPM compared to participants with lower jealous concerns.

4. Participants with preoccupied or fearful attachment style will score higher on the JPM compared to participants with secure or dismissive attachment style.

5a. As JPM scenarios increase in provocation, fewer differences will occur between the clinical (OCD) and the non-clinical participants.

5b. As JPM scenarios increase in provocation, fewer differences will occur between securely attached and anxiously attached (preoccupied and fearful style) participants.

Method

Design

The study employed a cross-sectional, quantitative online-survey design. Opportunistic and snowball sampling methods were employed to recruit participants. An online survey was designed to capture data.

JPM design. The JPM was designed by the main researcher after consideration of the existing literature. Input to the design was provided by the research supervisors, who have extensive experience in jealousy and emotion research.

The JPM consists of eight connected and evolving jealousy-provoking scenarios. Each scenario had four behavioural options for participants to choose (see Appendix B for copy of the JPM). The scenario escalated in provocation and followed a narrative. Scenarios were based on an Inventory of Jealousy-Provoking Partner Behaviours (Dijkstra, Barelds and Groothof, 2010).

Behavioural options for each scenario were based on Bartholomew and Horowitz (1991) four-group model of attachment (secure, preoccupied, dismissing and fearful) and previous research concerning jealousy and attachment. Table 1 outlines how the concepts of anxiety/avoidance and positive/negative view of self and others combine to form the four attachment styles.

Table 1
Model of adult attachment adapted from Bartholomew and Horowitz (1991) four-group model of attachment.

	MODEL OF SELF (Anxiety)	
	Positive (Low)	Negative (High)

MODEL OF OTHER (Avoidance)	Positive (Low)	SECURE	PREOCCUPIED
	Negative (High)	DISMISSING	FEARFUL

Attachment theory suggests each attachment style would demonstrate different levels of jealousy, resulting in different behavioural options on the JPM being chosen in response to each jealousy-provoking scenario. Table 2 contains the behavioural options and attachment styles with associated scoring. The scoring range on the JPM was 8-32, as it contains eight scenarios.

Table 2.
JPM behavioural options scoring system

Attachment style	General description	JPM score	Prediction
Avoidant/dismissive	Express less jealousy due to self-sufficiency and detachment from relationships	1	Remain detached from feelings of jealousy

Secure	Moderate jealousy profile – will not avoid or suppress emotion. Will not be highly reactive to jealousy	2	Show increasing reactivity to increasing threat
Preoccupied	Reactive to jealousy - behave in ways to maintain relationship/clinginess	3	Show reactivity at low provocation scenarios
Fearful	Highly reactive to jealousy – responses extreme with high levels of attachment frustration	4	Highly reactive at low provocation scenarios

Note: JPM=Jealousy Provocation Measure

Participants' interaction with the JPM was timed using the timing function of the survey software. It was intended that the timing variable would provide a 'real-time' measure of impulsivity. Further information about the timing variable and survey software is provided below.

Development of the JPM. A 90-minute focus group established the content and face validity of the scenarios and behavioural options. The focus group participants consisted of two trainee clinical psychologists, two experienced post-doctoral researchers and an experienced psychotherapist. If the focus group participants disagreed on the wording or context of a scenario or behavioural option, a discussion took place until majority agreement was reached. Following this discussion, necessary amendments were made. The JPM was combined with the other measures (see below) and an online survey was created on the survey software Qualtrics (Qualtrics, 2005). The completed online survey was then piloted by four PhD students who gave feedback on the technical aspects of the survey, such as errors in the flow of the survey and programming issues. Necessary amendments were made following this feedback.

Inter-rater agreement of behavioural options. Two independent raters (trainee clinical psychologists) tested whether each behavioural option on the eight scenarios could be classified into the correct attachment style. A Kappa value of 0.70 was found indicating good inter-rater reliability (Altman, 1991).

Sample size calculation. The study aimed to recruit three groups of participants (student, community and clinical-OCD). Power analysis using G*Power 3.1 (Faul, Erdfelder, Lang, & Buchner, 2007) determined the appropriate sample size of the study. As proposed by Cohen (1977), 80% power was set. In addition, a large effect size of 0.4 was entered. In order to detect a similar effect size, with an alpha or significance level of 0.05, and a power of 0.8, the required sample size would be 64. This is based on using an analysis of covariance with 1 covariate and 2 degrees of freedom.

Participants

Recruitment. Participants were recruited over a seven-month period between April - November 2015. Recruitment was targeted at three groups (clinical-OCD, community and student) to address the research aims. All participants were told the study aimed to develop new ways of exploring and assessing emotions in adult romantic relationships. Participants were told what the survey involved, inclusion/exclusion criteria and how to access the study.

To maximise the clinical (OCD) sample, the main researcher attended the national conference of OCD Action. OCD Action is a national UK charity focusing on OCD. Participants had the opportunity to complete the survey on the day (by laptop, *n* = 0) or take home a business card (*n* = 38) that contained the hyperlink to the survey (Appendix C). The request for participants was also posted on the OCD Action website (Appendix D). Specific OCD social media platforms (non-NHS) were also targeted (OCD Memoirs Facebook page and

OCD/OCD Awareness Facebook page). The request for participants with the link to the survey was placed directly on the Facebook page. The recruitment adverts for OCD participants did include additional information that both participants with and without OCD could take part in the survey.

The electronic student research volunteer database of The University of Sheffield was accessed to target the student sample. A request for participants was posted on the database as well as being emailed to the distribution list of students (Appendix E). Those who wished to access the survey could click on the hyperlink that directed them to the online survey. The volunteer database also included university staff and those staff who participated were added to the community sample, unless they self-identified as having OCD (described below).

To target a community sample the online survey was also posted on a local community forum (Sheffield Forum, Appendix F) and the social media site, Facebook. The use of social media allowed for snowball sampling to take place. The online survey was shared by social media users with their own contacts who may not have seen the original advert.

All participants (from any of the targeted recruitment methods) who self-identified as experiencing OCD were added to the OCD sample. The only exception to this was if the participant identified as a student and as experiencing OCD, these participants were deleted from the sample (*n* = 34). In total *N* = 1000 participants initially accessed the survey. Table 3 shows the demographics of the three groups.

Table 3

Demographics of the three groups.

	Group		
	Community (*n*=212)	Student (*n*=406)	Clinical (*n*=61)

Females (*%*)	154 (*72.6*)	324 (*79.8*)	52 (*85.2*)
Males (*%*)	58 (*27.4*)	82 (*20.2*)	9 (*14.8*)
Mean age in years(*SD*)	36.23(*10.81*)	23.23(*5.96*)	26.75(*7.77*)
Marital status (%)			
Single	26 (*12.3*)	119 (*29.3*)	16 (*26.2*)
Married/Civil partnership	80 (*37.7*)	30 (*7.4*)	6 (*9.8*)
Cohabitating	69 (*32.5*)	72 (*17.7*)	13 (*21.3*)
Divorced	4 (*1.9*)	1 (*0.3*)	1 (*1.6*)
Dating not living together	33 (*15.6*)	184 (*45.3*)	25 (*41.1*)
Sexual orientation (*%*)			
Heterosexual	188 (*88.7*)	353 (*86.9*)	52 (*85.3*)
Homosexual	11 (*5.2*)	11 (*2.7*)	3 (*4.9*)
Bisexual	12 (*5.7*)	32 (*7.9*)	6 (*9.8*)
Rather not say	1 (*0.4*)	10 (*2.5*)	0
Mean length of current or most recent romantic relationship in years(*SD*)	8.69(*9.67*)	2.32(*3.90*)	3.89(*5.97*)

Note: 41 cases with missing data that could not be allocated for group analysis, total *N*=720

Inclusion and exclusion criteria. Participants were required to be over the age of 18, to be in a romantic relationship or to have experienced a romantic relationship in the past that lasted for one month or more. Participants also needed to be able to read and understand English and have access to a computer with internet access.

Flow of participants into final sample and demographics. Figure 1 depicts the flow of participants into the final sample and at what point exclusions were made. Participants were required to have completed the JPM to be included in the final sample. Outliers on all outcome measures three standard deviations above or below the mean were removed. The final research sample was *N*=720. The mean age in the research sample was 27.71 years (SD=10.05); the majority were female (77.2%) and heterosexual (87.6%). A large proportion were in either a dating relationship not living together (34.7%) or single (25%).

N = 1000 participants accessed the survey and consented to take part.

Figure 1. Diagram showing the flow of participants into the final sample.

Ethical Considerations

The University of Sheffield's Department of Psychology Research Ethics Committee granted ethical approval of the project (project code: 143414). Supporting documentation can be found in Appendix G.

Online survey. The British Psychological Societies (BPS) ethical guidance for internet-mediated research was adhered to (BPS, 2013). This document highlights important considerations for psychological research being conducted online. Participants provided informed consent to participate in the survey after reading an information sheet (Appendix H). Participants who were excluded from the survey due to lack of consent, age or lack of relationship experience were automatically directed to the end of survey summary page (Appendix I).

Monetary incentive. Participants were offered the opportunity to enter into a free prize draw to win £15 of Amazon vouchers. To ensure that BPS ethics guidance (2013) for online research was followed, participants were clearly informed that they did not have to complete the survey to be entered in to the prize draw. The small incentive to participate was deemed appropriate because participation had a low risk of harm. The guidelines from the Market Research Society (2006) concerning free prize draws was also followed.

Outcome Measures

The JPM was presented with other outcome measures to create the completed online survey.

Demographic information. This included; gender, age, marital status, sexual orientation and length of current or most recent romantic relationship.

Jealousy. The Short Form – Multidimensional Jealousy Scale (SF-MJS; Elphinston et al., 2011, Appendix J) was used to measure jealousy. The SF-MJS emerged from research attempting to validate the original Multidimensional

Jealousy Scale (MJS; Pfeiffer & Wong, 1989). A 17-item short form was established, with three factors representing cognitive, emotional and behavioural jealousy. The SF-MJS has adequate concurrent and discriminative validity and high internal validities ranging from α = 0.70 to 0.81. The alpha value for the present study was .73.

On the SF-MJS, participants were asked to respond with their current or most recent partner in mind. For the cognitive subscale (5 items), participants indicated how often certain thoughts occurred, with responses ranging from 1 (*never*) to 7 (*all the time*). An example item is *'I suspect that X may be attracted to someone else'*. The emotional subscale (6 items) asked participants to consider their emotional reactions to various situations from 1 (*very pleased*) to 7 (*very upset*). An example item is *'X is flirting with someone else*'. Finally, on the behavioural subscale (6 items), the participants rated how often they had engaged in a particular behaviour from 1 (*never*) to 7 (*all the time*). An example item is '*I look through X's drawers, handbag, or pockets'.* The questions were adapted so that they were relevant for individuals in both heterosexual and homosexual relationships.

Single item trait jealousy. Bauerle et al. (2002) reported that self-assessment of jealousy is subject to marked social desirability bias. Bauerle et al. speculated that this bias could be minimized with regard to trait jealousy by asking for ratings from a friend's point of view. Therefore, the question *"How jealous do you think your friends consider you to be?"* was used and rated on a seven point rating scale from 1 (*Very little*) to 7 (*Very much*).

Attachment. Adult attachment style was measured by the Experiences in Close Relationships – Short Form (ECR-SF; Wei, Russell, Mallinckrodt, & Vogel, 2007, Appendix K). The ECR-SF was adapted from the original 36-item

Experiences in Close Relationships Scale (ECR; Brennan, Clark, & Shaver, 1998). The ECR-SF possesses a stable factor structure and acceptable internal consistency with coefficient alphas from 0.77 - 0.86 for the anxiety subscale, and from 0.78 - 0.88 for the avoidance subscale. It also has good test-re-test reliability and construct validity (Wei et al., 2007).The ECR-SF consists of 12 self-report items examining dimensions of anxiety (6-items; e.g*. I need a lot of reassurance that I am loved by my partner*) and avoidance (6-items; e.g*. I want to get close to my partner, but I keep pulling back*). Items asked participants to rate on a 7-point scale how much the statements correspond to how they feel in romantic relationships in general (*1 strongly disagree to 7 strongly agree*). Internal consistency in the present study was α = .72 for anxiety and α = .77 for avoidance.

Obsessive-compulsive traits. The obsessions and checking subscales of the Obsessive-Compulsive Inventory- Revised (OCI-R; Foa et al., 2002, Appendix L) measured obsessive and compulsive traits. The original OCI (Foa, Kozak, Salkovskis, Coles & Amir, 1998) was developed as a comprehensive self-report measure for assessing symptoms of OCD and demonstrated excellent psychometric properties. The shortened OCI-R was created to better accommodate its use in both clinical and research settings. The scale has showed good test-re-test reliability across different clinical samples and acceptable validity (Foa et al., 2002). A stable 6-factor structure has been confirmed with four of the six subscale coefficients exceeding α = 0.72. Internal consistency in the current study was α = .67 for both the obsessing and checking subscales.

Participants were asked how much certain experiences had distressed or bothered them in the past month (*1= not at all* to *6= extremely).* The obsessing

subscale (3 items) is able to differentiate between people with OCD and non-anxious controls better than the total OCI-R score. An example item is '*I find it difficult to control my own thoughts'*. The checking subscale (3 items) was used to provide a measure of compulsion related to OCD. An example item is '*I check things more often than necessary*'.

Impulsivity. The Barratt Impulsiveness Scale-11 (BIS-11; Patton, Stanford & Barratt, 1995, Appendix M) assessed behavioural concepts of impulsiveness. The measure has three main factors, attentional impulsivity (made up of attention and cognitive instability), motor impulsivity (motor and perseverance) and non-planning impulsivity (self-control and cognitive complexity). At the scales development stage, factors correlated significantly with each other from α = .46 to α = .53. The scale has an internal validity and test-re-test reliability of α = .83 and excellent convergent and divergent validity (Stanford et al., 2009).

The BSI-11 consists of 30 items scored from 1 (*rarely/never*) to 4 (*almost always/always*). An example item is '*I do things without thinking'*. The internal validity in the present study is reported as α = .80.

Response time. Timing functions measured each participant's interaction time with the JPM. Participant's first click on each scenario was used as a measure of 'real-time' impulsivity/response-inhibition. All other measures were also timed so they could be used as control variables. Timings were recorded in seconds and milliseconds. Each timing variable was created by calculating the mean of each timing function at different stages of the survey. The timing variables referred to throughout this study are outlined in Table 4.

Table 4
Description of timing variables.

Timing variable	Description

JPM first click	Initial interaction (first click) with the eight scenarios.
Whole survey first click	Initial interaction time (first click) with each outcome measure across the whole survey (including the JPM).
Non-jealousy measures first click	Initial interaction time (first click) with each outcome measure (excluding the JPM).

Note: JPM = Jealousy Provocation Measure

Procedure

Participants accessed the online survey via the hyperlink and submitted responses electronically. Depending on their gender and sexual orientation, participants were directed to differently worded surveys to fit with their sexual orientation. The wording of each survey was identical apart from the substitution of male/female roles. Homosexual and bisexual relationships were also accounted for.

Data Analysis

Data analysis were completed using SPSS version 21 (IBM Corp, 2012). To avoid deflation of individual scores due to item missing data, the mean of each participant's score on each outcome measure was used in the analysis. The only exception to this was trait jealousy, which was an individual item.

Initially the demographic data were analysed to check for any significant associations with the outcome variables. This was done using Analysis of Variance (ANOVA), t-tests and correlation as appropriate. To establish convergent and divergent validity of the JPM (hypothesis 1a) and to examine the association between jealousy and the JPM (hypothesis 1b), Pearson product-moment correlations were used. One-way ANOVA's were used to assess potential differences between the research groups (community, student and clinical) to test hypothesis 2. Post hoc tests were carried out where appropriate to see which group means differed significantly, applying Bonferroni

corrections. Tukey HSD or Games-Howell post hoc tests were reported depending on the results of the homogeneity test and whether the non-parametric results differed from the parametric results. The correlation between jealousy and the JPM timing variables were examined to test hypothesis 3. Multiple linear regression analysis was used to test hypothesis 4. Attachment anxiety and avoidance were entered simultaneously as predictors of the JPM score, along with the interaction between anxiety and avoidance. The interaction between anxiety and avoidance represented the four attachment groups (dismissive, secure, preoccupied and fearful). Hypotheses 5a and 5b were tested using repeated measure Analysis of Covariance (ANCOVA) to understand various groups' movement through the JPM. The ECR-SF scores were used to categorise each participant into attachment groups using instructions provided by Fraley (2012), calculations can be seen in Appendix N. To test whether there was a significant difference between how the groups moved through the JPM, the score at each scenario was entered as the repeated within-subjects factor with either sample group or attachment group entered as the between-subject factor. Gender was entered as a covariate. Graphical representation using the mean score at each scenario provided a visual representation of this analysis. One way ANCOVAs examining the difference between the groups at each JPM scenario were also used, controlling for gender and age.

Data Screening

All participants in the final sample had completed the JPM. There were however some missing data from the other outcome measures. This was accounted for by excluding cases pairwise in the analyses.

Outcome data were screened in relation to the basic assumptions of parametric analysis. All variables showed small positive skews (below 1). Kurtosis values were also small and ranged from -.45 (attachment anxiety) to .84 (jealousy). Due to the size of the sample, normal distribution curves were inspected on histograms (Field, 2009). All variables showed a normal distribution, except attachment avoidance, obsessing and checking subscales. However, skewness and kurtosis were within the range of normal distribution for both of these measures (Gönner, Leonhart & Ecker, 2008; Wongpakaran & Wongpakaran, 2012). Response times showed larger skewness and kurtosis values that were reduced by using square root and log transformations[1].

The JPM violated the assumption of homogeneity. When this occurred within an analysis the non-parametric equivalent (when available) was also performed[2]. On examination of Mauchly's test, the assumptions of sphericity were violated for the JPM at each scenario therefore multivariate tests were reported (Pallant, 2013).

Results

[1] A square root transformation reduced the skewness and kurtosis value in the JPM first click variable to 0.45 (SE = .09) and 1.15 (SE = .18) respectively. Square root transformations improved the whole survey first click variable and log 10 transformations improved the non-jealousy measures first click variable. Transformed time variables were used in all analyses.

[2] Non-parametric analyses did not differ from the main results of the parametric tests. Thus, only parametric results are reported.

Relationships Between Demographic and Outcome Variables

Females scored significantly higher on the JPM ($t(718) = 3.11$, $p = .002$, $r = .01$) and had significantly higher SF-MJS jealousy scores ($t(702) = 3.44$, $p = .001$, $r = .02$) than males. There was also a significant difference between marital status groups ($F(4,715) = 2.55$, $p = .038$, $r = .11$), with divorced and cohabiting participants having higher JPM scores. However, post hoc tests were non-significant. The interaction effect between gender and marital status on the JPM was non-significant ($F(3,710) = 1.93$, $p = .12$) and the main effect of gender remained ($F(1,710)=5.78$, $p =.02$, $\eta^2 = .01$). Based on these results, gender was used as a covariate where appropriate in further analyses. Age showed small negative correlations with the JPM ($r =-.12$, n = 754, $p = .001$) and the SF-MJS ($r =-.22$, n = 708, $p = .000$).

JPM Validation

Convergent validity. Table 5 presents correlations between the JPM and the other jealousy measures. The JPM correlated positively with the other jealousy measures (all $p < .01$), supporting Hypothesis 1a and establishing convergent validity. Hypothesis 1b was also supported, as higher JPM scores (more reactive behavioural options) were associated with higher jealousy (as measured by the SF-MJS). The emotional subscale of the SF-MJS produced a higher correlation ($r = .44$) with the JPM than the other MJS subscales.

y results

	JPM	SF-MJS	SF-MJS Cognitive subscale	SF-MJS Emotional subscale
	.45** (n=704)			
	.11** (n=704)	.56** (n=704)		
	.44** (n=704)	.61** (n=704)	-.04 (n=704)	
I	.26** (n=704)	.73** (n=704)	.30** (n=704)	.11** (n=704)

Divergent validity. The JPM did not correlate significantly with the attachment dimension of avoidance. As expected, there was a medium significant correlation with the attachment dimension of anxiety (r = .30, p =.000). There were small significant correlations between the scenario measure and the OCI obsessing (r = .21, p = .000) and checking (r =.19, p = .000) subscales. Finally there was a small significant correlation with the impulsivity measure (r = .11, p = .000).

Reliability. An alpha coefficient of .61 for the JPM was found. This was not improved by removing any of the scenarios. Strong alpha scores would not be expected, as scenarios were measuring the response to different provocation levels.

JPM; Sample Comparisons

Table 6 reports the JPM means (standard deviations) for each study group. Hypothesis 2b was partially supported as the clinical group (OCD) scored significantly higher than the community group across a number of the measures, including the JPM.

The clinical group did not differ significantly from the student group on a number of measures, including the JPM and jealousy. There were statistically significant differences in age and relationship length across the three groups. The student group were younger than the OCD or community group. In addition, the community group had significantly longer relationships than the student or clinical group. One-way ANCOVAs were conducted with SF-MJS (jealousy) as the dependent variable, with age and total relationship length entered separately as covariates. The main effect of group was no longer significant when controlling for age, $F(2,675) = 2.06$, p = .13. There was a main effect of age, $F(1,675) = 15.51$, p =.00, η^2 = .02. The main effect of group remained

when controlling for relationship length. To examine the effect of age on the community and clinical group, the student group were removed from the analysis. The one way ANCOVA revealed that the main effect of group remained when examining the difference between jealousy scores across the community and clinical group, $F(1,270) = 4.42$, $p = .03$, $\eta^2 = .02$. The clinical group showed statistically higher jealousy scores (SF-MJS total score) than the community group. ANCOVA to control for age could not be performed on the JPM as homogeneity of variance was violated.

) and differences across the measures

ıbscale	Community (C) n=212	Student (S) n=406	Clinical (OCD) n=61	F (*df*=2,676)	*p*
-	2.24 (.37)	2.33 (.37)	2.47 (.45)	10.05	.00
Total	2.91 (.49)	3.08 (.49)	3.14 (.51)	10.66	.00
'S cognitive	4.45 (.63)	1.65 (.72)	1.78 (.80)	7.70	.00
S emotional	5.02 (.84)	5.25 (.80)	5.32 (.93)	6.18	.00
behavioural	2.00 (.75)	2.10 (.75)	2.11 (.75)	1.44	*NS*
-	2.16 (1.27)	2.77 (1.46)	3.02 (1.51)	15.98	.00
ɔidance	2.39 (1.05)	2.44 (1.04)	2.50 (1.16)	.28	*NS*
nxiety	3.26 (1.08)	3.75 (1.06)	4.31 (1.17)	27.11	.00
ıecking	1.96 (.80)	2.08 (.84)	3.03 (.92)	40.69	.00
sessing	1.92 (.78)	2.05 (.82)	3.08 (.88)	50.66	.00
Total	2.08 (.32)	2.09 (.31)	2.03 (.32)	.754	*NS*
entional	2.04 (.42)	2.14 (.43)	2.26 (.43)	7.57	.00
-planning	2.17 (.42)	2.18 (.40)	2.05 (.44)	2.77	*NS*
Motor	2.01 (.35)	1.95 (.35)	1.86 (.38)	5.10	.00

Provocation Measure; SF-MJS=Short Form-Multidimensional Jealousy Scale,
Close Relationships-Short Form, OCI=Obsessive Compulsive Inventory, BSI-II

There were no differences between groups on the JPM timing-variable. There was a significant difference between groups on the whole survey first click variable ($F(2,676) = 3.57$, $p = .029$, $\eta^2 = .01$) and on the non-jealousy measures first click variable ($F(2,676) = 5.97$, $p = .003$, $\eta^2 = .01$). Both these analyses revealed that students had quicker initial responses on the survey questions than the community group.

Real Time and Self-Reported Impulsivity and Jealousy

Initially, response time variables were correlated with the impulsivity measure (BSI-II) to test their validity as measures of impulsivity. These data are presented in Table 7. Small negative correlations were found between all first click time variables and the BSI attentional subscale. The lack of correlation between the time variables and total BSI, reduced confidence that the time variables were measuring trait impulsivity. In this case, an inability to pay attention to the task in hand was associated with a faster first interaction (click) with each of the online survey questions. However, due to the small correlations these results must be interpreted with caution.

Table 7
Pearson correlations between survey response time variables and impulsivity.

	JPM first click	Whole survey first click	Non-jealousy measures first click
BSI total score	-.00	-.02	-.04
BSI Attentional subscale	-.09*	-.12**	-.14**
BSI Non-planning subscale	.05	.05	.02
BSI Motor subscale	.01	.00	.00

Note: BSI = Barratt Impulsiveness Scale; JPM = Jealousy Provocation Measure; Whole survey = reaction time across the survey including the JPM, Non-jealousy measures = reaction time of measures excluding the JPM. * $p < 0.05$ level. ** $p < 0.01$ level. $n = 685$.

Pearson product-moment correlations were used to examine the association between jealousy and impulsivity. The JPM and other jealousy measures were significantly correlated with the measure of impulsivity and some of the timing variables. These data are presented in Table 8. The non-jealousy measures time variable is excluded from the table, as it showed no significant correlations with the jealousy measures.

Across all groups, the small to medium positive correlations between the JPM and the JPM first click variable demonstrated that those scoring higher on the JPM were also taking longer in their first interaction with each scenario. These correlations are small (and must be interpreted with caution), but suggest that individuals who reacted most to jealousy provocation were generally slower in responding to questions.

Within the clinical-OCD group, medium negative correlations were found between jealousy scores (SF-MJS) and the JPM first click and whole survey first click variables. These correlations suggest that higher levels of jealousy

within the OCD group were associated with participants interacting faster with each page of the JPM and overall survey.

alousy variables, impulsivity and response times.

JPM measure first click	Whole survey first click	BSI total	BSI Attentional	BS pl
Group – Community (n=212)				
.18**	.16**	.10	.16*	
.12	.12	.08	.22**	
.08	.09	.11	.13*	
.10	.06	-.06	.11	
.06	.06	.14*	.19**	
.01	.00	.29**	.40**	
Group – Student (n=406)				
.13**	.12*	.10*	.05	
-.01	-.01	.09	.09	
-.08	-.06	.11*	.09	
.03	.03	-.07	-.05	
.01	-.01	.15**	.15**	
.02	-.01	.11*	.08	
Group – Clinical (OCD) (n=61)				
.30**	.21	.26*	.19	
-.33**	-.31*	.10	.26*	
-.20	-.17	.12	.18	
-.14	-.19	.00	.12	
-.29*	-.23	.09	.20	
.16	.11	.27*	.21	

rovocation Measure, SF-MJS= Short Form- Multidimensional Jealousy Scale

To ensure that these results could not be accounted for by compulsion associated with OCD, the checking subscale of the OCI was used as a control variable within a partial correlation between jealousy and first click time variables. The negative associations remained significant for the JPM first click variable (r = -.33, p = .010) and the whole survey first click variable (r = -.31, p = .014) in the clinical group. To try to establish whether the quicker response times in the OCD group were unique to participants' performance on the JPM, the first click time across the non-jealousy outcome measures was also controlled for. Using a partial correlation, the negative correlations remained significant in the clinical group (JPM first click variable (r = -.30, p = .02) and whole survey first click variable (r = -.32, p = .01)). In addition, the medium

strength positive correlations between the JPM and SF-MJS total jealousy in the overall sample (see Table 5) were no longer apparent in the clinical group. However, the JPM did correlate with emotional jealousy (r = .32, p = .01) in the clinical group. Thus, within the clinical-OCD group, those participants who chose behavioural choices on the JPM that were more reactive, also reported higher emotional upset to jealousy provoking situations when considering their current or past partner.

Hypothesis 3 postulated that participants reporting more jealousy would have quicker reaction times for making decisions on the JPM. The correlations indicate that this was only true for the OCD group's initial interaction with the scenarios. To test this pattern of results further, a multiple regression analysis was conducted to examine the interaction of group and jealousy on response time. The student group was removed from this analysis as it did not differ significantly from the clinical group on levels of jealousy and had participants who were significantly younger than the other two groups. Group (OCD and community), jealousy (SF-MJS total) and the interaction between these two variables were entered into a multiple regression as predictors of the JPM first click variable. A significant regression equation was found (F(3,269) = 2.73, p = .04, R^2 = .03). The interaction between group and jealousy was also significant (β = -1.23, t(272) = 2.80, p =.005). Graphical representation of this interaction

can be seen in Figure 2.

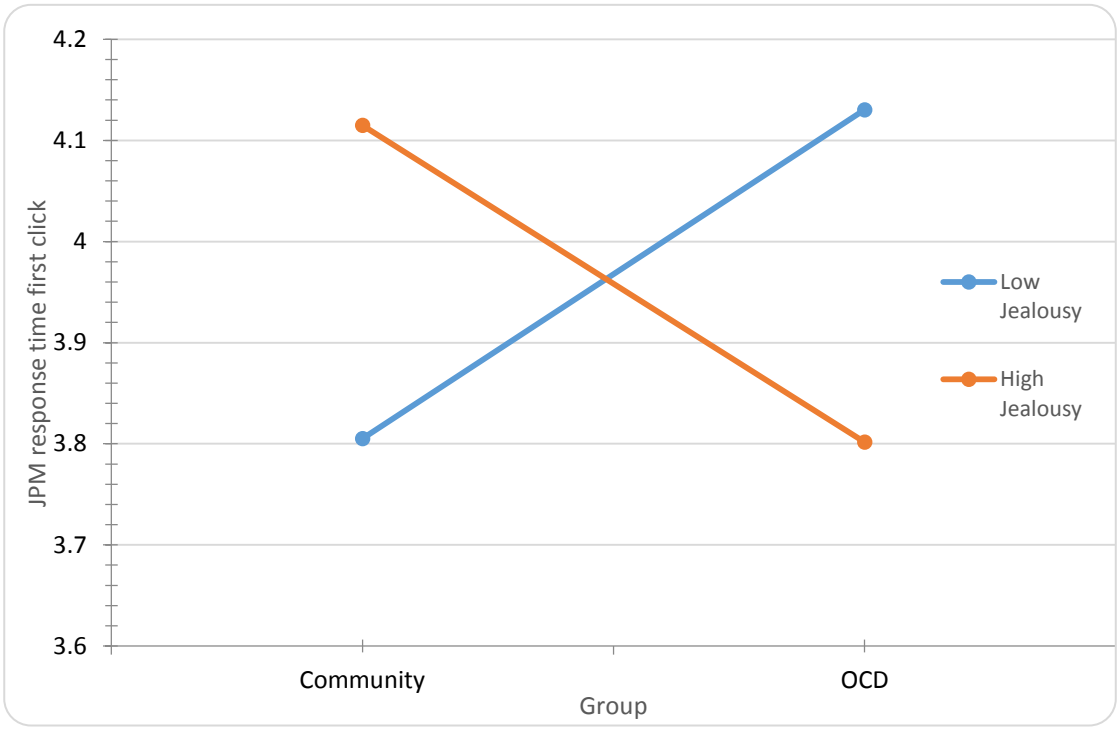


Figure 2. Interaction between group and jealousy as predictors of first click response time on the JPM.

Participants within the OCD group with higher levels of jealousy responded to the scenarios quicker, as measured by their first interaction (click) with the page. Jealousy was also associated with attentional impulsivity in this group. In addition, participants from the community sample with low jealousy also showed quicker response times on the JPM. Hypothesis 3 is only partly supported as all participants, regardless of group, experiencing high jealousy were expected to have quicker responses on the JPM. Combined with the significant negative correlations between jealousy and the scenario time variable, the results indicate a clear pattern that suggests jealousy and impulsivity operate differently within the clinical-OCD population[4].

JPM and Attachment

[4] A curvilinear relationship between jealousy and response time on the JPM was tested using a multiple regression. The JPM first click variable was entered as the dependant variable, with jealousy (SF-MJS) and jealousy squared entered as predictors. The regression equation was non-significant ($F(2,701) = .79$, $p = .45$) and there was no main effect of the squared term (β=-.38, $t(703) = 1.21$, p=.23). A curvilinear relationship between jealousy and response time was not supported.

A multiple linear regression analysis was performed to examine the effect of the attachment dimensions (anxiety and avoidance) and their interaction (attachment group) on the overall JPM outcome. Results indicate that the model accounted for 9.4% of the variance in JPM score ($F(3,685) = 23.81$, $p = .000$, $R^2 = .094$). There was a main effect for anxious attachment only ($\beta = .238$, $t(688) = 2.55$, $p = .011$). Thus, individuals with greater anxious attachment chose behavioural choices on the JPM that were more reactive.

Hypothesis 4 predicted that preoccupied and fearful attachment styles would score higher on the JPM (choose behavioural choices that were more reactive) compared to the secure and dismissive styles. However, there was only a main effect of anxious attachment. Thus, the dimensional theory of attachment appears more relevant in explaining the responses of participants compared to the categorical theory, with higher attachment anxiety associated with higher JPM scores.

Movement within the JPM; Group Comparisons

Mauchly's test indicated that the assumption of sphericity had been violated ($\chi^2(27) = 289.94$, $p = .000$), and so multivariate tests were reported. There was a significant interaction effect between scenario and sample group ($F(14,1340) = 2.15$, $p = .008$, Wilk's $\Lambda = .96$, $\eta^2 = .22$), suggesting that the combination of group and scenario influenced overall JPM score. Mean scores for each scenario across the groups are depicted in Figure 3. The clinical-OCD group scored consistently higher than the other groups across the scenarios. However, the graph shows that the scenarios did not produce a clear pattern of increasing provocation as anticipated. Table 9 reports the means(SD) and ANOVA results for each scenario to display how the groups progressed through the scenarios.

cenario and the difference between groups					
	Group				
	unity (C) 212)	Student (S) (*n*=406)	Clinical (OCD) (*n*=61)		
	n(SD)	Mean(SD)	Mean(SD)	F(2,675)	p<.05
	(.67)	2.27(.68)	2.49(.81)	10.92	.000
	(.55)	2.01(.60)	2.15(.70)	7.32	.001
	(.80)	2.46(.84)	2.67(.91)	3.62	.027
	(.42)	2.19(.46)	2.26(.54)	.84	NS
	(.91)	2.52(.89)	2.72(1.08)	4.35	.013
	(.75)	2.47(.80)	2.59(.92)	2.68	NS
	(.73)	2.37(.68)	2.51(.77)	1.69	NS
	(.66)	2.36(.74)	2.39(.78)	.68	NS

tion. All analyses controlled for gender (male/female). Post-hoc in parentheses only

At scenarios one and two, the OCD group scored significantly higher than the community group. The student group also scored significantly higher than the community group on scenario one and two. One way ANCOVAs were performed controlling for gender and age separately and all significant results remained. However, these results cannot be interpreted with confidence as all of the scenarios (excluding scenario three) violated the homogeneity of variance assumption.

The Bonferroni adjustment meant there were no other significant differences between the groups, as the scenarios progressed beyond scenario two. Thus, as the narrative of the scenarios became more jealousy provoking, significant differences between the groups became less common. Despite

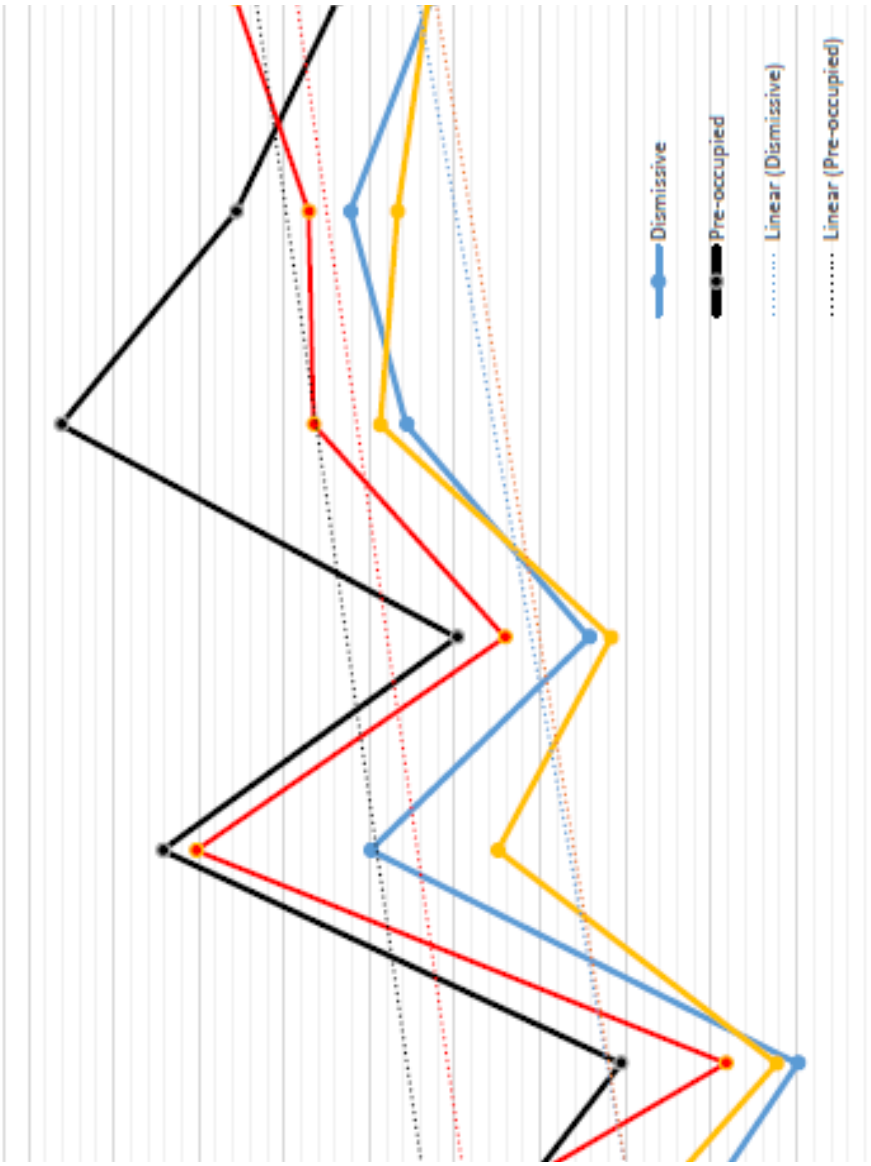
reactivity to jealousy provocation not increasing in a linear pattern as anticipated, the trend lines on Figure 3 suggest that there was a general trend of an increase in jealousy across the groups. One way repeated measures ANOVAs were conducted to examine the slope of change for each sample group. The eight scenarios were entered as the within-subjects factor and the data file was split by sample group. All three of the ANOVAs were significant ($p < .005$), indicating that all groups changed significantly across the JPM.

Hypothesis 5a stated that there would be fewer differences between the clinical and non-clinical groups in relation to their JPM score, as jealousy provocation increased. This was supported by the results and there was a significant change in JPM score for all groups as threat increased.

To examine the movement of the different attachment styles through the scenarios, participants' anxiety and avoidance scores on the ECR-SF were used to categorise them into Bartholomew and Horowitz (1991) four-group model of attachment (i.e. secure, preoccupied, dismissing and fearful). A repeated measure ANOVA, was conducted to examine how participants with different attachment styles moved through the scenarios.

Mauchly's test indicated that the assumption of sphericity had been violated ($\chi^2(27) = 284.65$, $p = .000$), and so multivariate tests were reported. There was a significant interaction effect between scenario and attachment group ($F(21,1950) = 1.77$, $p = .02$, Wilk's $\Lambda = .95$, $\eta^2 = .02$), suggesting that the combination of attachment group and scenario influenced JPM score. Mean scores for each scenario across the attachment groups are depicted in Figure 4. The pre-occupied and fearful group (high attachment anxiety) scored consistently higher on the scenarios than the dismissive or secure group. Once again, the results indicate that the scenarios did not produce a clear linear

pattern of reactivity to jealousy provocation. The means(SD) and ANOVA results for each scenario are presented in Table 10.


Dismissive
Pre-occupied
Linear (Dismissive)
Linear (Pre-occupied)

nario and the difference between attachment groups	Group				
(D)	Secure (S) (*n*=196)	Preoccupied (P) (*n*=151)	Fearful (F) (*n*=174)		
D)	Mean(SD)	Mean(SD)	Mean(SD)	F(3,684)	p<.05
)	2.14(.63)	2.30(.75)	2.41(.74)	8.47	.000
)	1.92(.54)	2.11(.70)	1.98(.65)	3.82	.010
)	2.25(.78)	2.64(.84)	2.60(.84)	8.56	.000
)	2.12(.41)	2.30(.47)	2.24(.55)	5.72	.001
)	2.39(.95)	2.76(.95)	2.46(.86)	6.61	.000
)	2.37(.76)	2.56(.81)	2.47(.82)	1.70	*NS*
)	2.33(.68)	2.44(.73)	2.56(.70)	4.26	.007
)	2.25(.63)	2.46(.77)	2.45(.77)	4.55	.004

When examined at a stringent level of significance, differences between the attachment groups were less common towards the end of the JPM. To ensure that the results were not due to gender, one way ANCOVAs were performed controlling for gender and all significant results remained. However, these results cannot be interpreted with confidence as all of the scenarios (excluding scenario three) violated the homogeneity of variance assumption.

To examine in more detail, which groups changed across the scenarios, one way repeated measures ANOVAs were conducted to examine the slope of change for each attachment style. The eight scenarios were entered as the within-subjects factor and the data file was split by attachment group. All four of

the ANOVAs were significant (p = .000), indicating that all groups changed significantly across the scenarios.

Hypothesis 5b stated that there would be fewer differences between participants with a secure attachment style than those with an anxious attachment style (preoccupied and fearful) in relation to their scores on the JPM as jealousy provocation increased. The hypothesis is supported as differences between the groups became less common as provocation increased. All attachment styles changed significantly across the scenarios.

With the exclusion of scenario five, preoccupied and fearful attachment were never significantly different from each other in their JPM scores. In addition, secure and dismissive attachment were never significantly different from each other in their JPM scores. However, preoccupied and fearful styles were often different from secure and dismissive styles. These findings once again support the dimensional theory of attachment rather than a categorical theory, suggesting that individuals with higher anxious attachment display more reactive behavioural responding to jealousy cues.

Discussion

This study aimed to evaluate a new ecologically valid method of assessing jealousy, by developing and testing a scenario-based jealousy measure, grounded in the theory of attachment. Self-report methods were combined with the real time measurement of impulsivity to try to overcome limitations in the measurement of this complex social emotion (DeSteno, 2010). The JPMs sensitivity to difference in reactivity was examined in clinical and non-clinical samples and at increasing levels of jealous provocation. The options and response times of participants from three separate samples (community,

student and clinical-OCD) represented the behavioural choices to an evolving and jealousy-provoking scenario.

Summary of Main Findings

The JPM demonstrated acceptable internal consistency, convergent and divergent validity (hypothesis 1a). Higher scores on the JPM were associated with higher jealousy scores, endorsing the JPM as a measure of jealousy (hypothesis 1b). The clinical-OCD group had statistically higher scores than the non-clinical community group across all the measures, including the JPM (hypothesis 2). Hypothesis 3 was only partially supported, as the association between jealousy and quicker response time was only found within the clinical group. Participants within the OCD group whom had higher levels of jealousy responded to the scenarios quicker, as measured by their first interaction with each scenario. A curvilinear relationship between jealousy and response time was not supported, suggesting that this pattern was unique to those with OCD, rather than being due to this group having higher levels of jealousy. Hypothesis 4 was not supported, as only those with anxious attachment were more likely to endorse reactive responses to jealousy on the JPM. Across the study, the dimensional approach to measuring attachment offered a better explanation for the results (Mikulincer, Shaver, & Pereg, 2003). As scenarios became more provocative, fewer differences emerged between the non-clinical and clinical participants. However, all groups changed significantly over the course of the JPM (Hypothesis 5a). In support of hypothesis 5b, there were fewer differences between those with secure attachment and those with anxious attachment, as the narrative became more jealousy provoking. All attachment styles changed significantly over the scenarios.

Connections with the Existing Literature

Within the existing literature, there has been scant systematic enquiry into what behaviours non-clinical populations select when jealous, and little definition of at what point people's behaviour actually changes when presented with a potentially jealousy inducing cue. Jealousy is labelled as pathological when behaviours such as excessive checking occur at a high frequency (Mullen, 1991). Mullen and Martin (1994) demonstrated that over 50% of their community population reported behaviours that displayed some degree of reactivity to jealousy. Although forced choice methods were used, the present study offers some support to the concept that non-clinical populations are equally capable of reactive behavioural responding to jealousy cues as clinical jealousy populations. This supports the concept of jealousy being a universal emotion (Clanton & Smith, 1977), and the current research suggests that emotion-driven behavioural responding subsequently occurs. Findings suggest that the differentiation between the measurement of pathological and non-pathological behavioural responding to jealousy may lie in the level of threat perceived. The present study finds that increased behavioural reactivity is common amongst those perceiving increased threat to their relationship.

There is evidence to suggest that some presentations of pathological jealousy might represent a variant of OCD (Agarwal et al., 2007; Agarwal et al., 2008; Cobb & Marks, 1979; Ecker, 2012; Parker & Barrett, 1997). This study finds that OCD participants reported significantly higher levels of jealousy than non-clinical participants. In addition, at low levels of relationship threat, OCD participants choose more reactive behavioural responses. However, as the narrative of the scenarios became more threating, fewer differences were found, despite the clinical participants reporting higher levels of jealousy overall.

The use of the JPM as a measurement tool for impulsivity was not as successful as hoped. There were some small correlations between self-reported impulsivity and response time measures. Correlations that were significant were in the expected direction, suggesting higher attentional impulsivity was associated with quicker response time. Interestingly, there seemed to be a clear pattern between increased jealousy and quicker initial response to scenarios in the OCD group. Existing research supports the concept of impaired response inhibition in people experiencing OCD (Boisseau et al., 2012; Chamberlain et al., 2007; Chamberlain, Fineberg, Blackwell, Robbins, & Sahakian, 2006; Sohn, Kang, Namkoong, & Kim, 2014). It is suggested that people with OCD often fail to inhibit already started actions. However, the increased initial interaction with the scenarios was only seen in those with OCD also experiencing higher jealousy. Causal links between these variables cannot be established from this study. It may be that there are a number of interrelated emotional and affective components influencing the result. For example, insecure attachment as conceptualised within Borderline Personality Disorder (BPD), has been clearly associated with impulsivity (e.g. Ball, Tennen, Poling, Kranzler, Rounsaville, 1997; Gurvits, Koenigsberg, & Siever, 2000). The clinical group in the present study had significantly higher levels of attachment anxiety than the community group, which might have indirectly influenced their impulsivity and levels of jealousy.

Existing research suggests that attachment style is associated with varying reactions to and experiences of jealousy (Collins & Read, 1990; Hazan & Shaver, 1987; Knobloch et al., 2001; Marshall et al., 2013; Radecki-Bush et al., 1993; Sharpsteen & Kirkpatrick, 1997). The JPM clearly demonstrated that anxious attachment was associated with greater behavioural reactivity to

jealousy provocation. Uniquely, the JPM has identified significantly higher reactivity to jealousy in those with anxious attachment at low levels of relationship threat, compared to those with low or no attachment anxiety.

White and Mullen (1989) propose that the purpose of jealousy is to maintain the relationship or one's self esteem in the face of a relationship threat. This process involves appraising the threat and reflecting on current coping resources. Insecurely attached participants will report greater perceived threat in response to relationship stressors, choose ineffective coping strategies (e.g. self-blame, not seeking social support) and report higher levels of depression (Radechi-Bush et al., 1993). In line with conclusions suggested by Radechi-Bush et al. (1993), the present study supports the use of attachment schemas in predicting emotional reactions to relationship threat. The present study also goes beyond these recommendations, by showing that participants with anxious attachment will select more reactive behavioural responses than those with low or no attachment anxiety. Anxiously attached participants perceived higher levels of relationship threat from low provocation scenarios and choose behavioural responses that were more reactive. This study is the first attempt to integrate attachment theory into the design of a jealousy measure and propose the concept of increasing relationship threat via an evolving scenario approach. Whilst there were clear associations between jealousy, anxious attachment and increased behavioural reactivity, the causal links between these concepts cannot be established from this study.

Limitations and Recommendations for Future Research

The use of forced choice methodology and hypothetical scenarios in the JPM pose a number of limitations. Criticisms of this methodology suggest that forced choice measures produce inaccurate results due to methodological

artefacts (DeSteno, 2010). The scenarios were hypothetical and grounded in a western conceptualisation of romantic relationships. The concepts within the scenarios may not be accessible across cultures or even socioeconomic status. Results drawn from this study only show what people believe they would do in a certain situation. To further the understanding of in vivo behavioural responses to jealousy, experience sampling and diary studies need to be conducted. Controls for social desirability would have also improved the current study.

The real time measurement of impulsivity within the online survey presents a number of challenges. Real time measures of impulsivity used within empirical research (e.g. stop signal task, Band, van der Molen & Logan, 2003; and the delay discontinue task, Hurst, Kepley, McCalla & Livermore, 2011) are often completed under laboratory conditions to reduce the potential effect of confounding variables. There was no control over when or how participants in the present study completed the measures. Distractions, internet speed and split attention are just a few possible influences effecting JPM completion time. Despite this, there were some small yet significant correlations in the predicted direction between self-reported and real time impulsivity. Links between jealousy and impulsivity would benefit from being studied under laboratory conditions.

The study recruited a large sample; however, the representativeness of this is called into question due to the self-selecting nature of participants. The large proportion of students within the sample mirrors previous concerns in using students to advance the understanding of jealousy (Mullen and Martin, 1994). There was also a higher proportion of women and people in heterosexual relationships, reducing the generalisability of the results to men

and those in homosexual or bisexual relationships. Randomly sampled and large community and clinical samples should be recruited in future research.

The inferential statistics used in the present study had some robustness against violations of assumption (Field, 2009). However, it must be noted that the evolving scenario design of the JPM had imbedded bias and assumed multicollinearity. The narrative of the JPM was such that responses to each scenario influenced the next.

Attention should be given to the experience of romantic jealousy for people with OCD. The results of this study suggest that this group can experience high levels of jealousy, however; no causal factors can be identified from this study. Unlike the Marazziti et al. (2003) study, the current research did not identify the main obsessions of the clinical-OCD participants. It was therefore impossible to control for this in the analysis. Despite insubstantial epidemiological data concerning obsessional jealousy, it seems unlikely that the study population of 61 adults reporting OCD all experienced jealousy as their main obsession. Future research would benefit from being longitudinal and making comparisons between people with OCD who are not in a romantic relationship. Other clinical populations should also be explored (e.g. BPD).

Although the scenarios were helpful in identifying increased reactivity to jealousy at low levels of relationship threat, the narrative of the scenarios did not result in a clear linear pattern of increasing reactivity to jealousy. The narrative of the JPM might need further adjustment, despite effective initial piloting. There is limited existing research outlining which interpersonal triggers are most jealousy provoking. Logically, unfaithful behaviour is listed as the most jealousy provoking behaviour in Dijkstra et al's. (2010) inventory. In the present study, scenario five emerged as the most provoking situation across groups,

detailing ‘your partner dancing closely’ with their work colleague. This was the first scenario to contain physical touch. For those with an anxious attachment, touch between their partner and a potential rival has previously been associated with increased feelings of jealousy, sadness, embarrassment and envy (Miller, Denes, Diaz, & Buck, 2014). The threat of observing physical touch between a partner and others is clearly an area for potential development in future jealousy research.

Clinical Implications

Jealousy is a multidimensional emotion encompassing a complex mix of thoughts, feelings and behaviours (White, 1981). There is a distinct lack of well-validated measures of jealousy for clinicians to use when faced with the assessment or treatment of jealousy (Woods, 2016). Despite being ‘overt’ and so observable, behaviour has been often ignored when it comes to the design of jealousy assessment measures. The ideas introduced in the present study suggest a measure of jealousy that could usefully supplement clinical assessment or be employed as an outcome measure. Questions focused on behaviour may be more accessible for clients than questions asking them to recall abstract feelings or thoughts, as is the case for previous measures of jealousy (e.g. the MJS). This may reduce the resistance often triggered by disjointed outcome measures (Miller, Duncan & Hubble, 2004). Although further development is needed, the scenario method may encourage a client to discuss his or her own narrative of jealousy. Assessment of behavioural reactivity in jealousy could also inform risk assessment when considering harm towards others and self. Finally, although causality cannot be established within the present study, co-morbidity of jealousy and OCD should be regularly assessed with patients presenting with jealous concerns.

Conclusion

The present study introduced an innovative method of assessing jealousy. A scenario based measure, which included everyday situations and increasing levels of relationship threat was used to assess behavioural responding in participants from three separate samples (community, student and clinical-OCD). The measure also integrated attachment theory to support the prediction of emotional responding to relationship threat. Despite identified methodological limitations, the JPM shows promise in the assessment of jealousy and is a step forward in the field.

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Appendix B

The Jealousy Provocation Measure (JPM. Scenarios for heterosexual female provided as an example).

Please try to complete this section with as little distraction as possible and in one go.
You will be presented with 8 scenarios. Each scenario has 4 response options. Please choose the response that is closest to how you would react.
The scenarios do not have much information but please try to imagine yourself in the situations.
Note: Response options presented in the following order (Dismissive, Secure, Preoccupied, Fearful) for appendix but were randomised in order for study.

1. Your partner tells you that they are going to have to work intensively on a project with a female colleague. They seem excited about this. The project means your partner will sometimes have to stay late at work and work closely with them in order to hit the deadline. Which statement is closest to how you would react?

   ○ I would think that my partners work colleagues were being too demanding and tell my partner this.

   ○ I would also feel excited and tell my partner that it sounded like a good opportunity for them.

- I would feel upset and I would start to ask some subtle questions about the work colleague and the project and start to monitor how late my partner was working.
- I would feel upset because I want my partner to spend time with me and I would withdraw into being silent with them.

2. When your partner is working late one night on the project, you call them to find out when they will be home, but they do not answer your call. Which statement is closest to how you would react?

- I would call once and if they do not answer, I would get on with my evening.
- I would leave a message or send them a text message asking them to call me back when they get a moment.
- I would feel upset, worry about what they are doing and who they were with and I would keep calling and leave a number of messages or send a number of texts.
- I would feel upset and would keep calling them and leaving messages or sending texts. When they did not answer, I would gradually become angry towards my partner in my messages.

Appendix B (continued)

3. You notice that recently your partner has started to take extra time to get ready for work and is really making an effort to look their best. Which statement is closest to how you would react?

- I would think my partner was silly for making so much effort and carry on with what I was doing.
- I would think that my partner is trying to make a good impression at work and think positively about this.
- I would feel upset, start to think about why they were making such an effort, but ask them why indirectly.
- I would feel upset and worry about my partner wanting to look good and I would challenge them about why they were making such an effort.

4. You are at your partners work party. You are getting a drink from the bar, when you notice that across the room your partner is talking to an attractive female stranger. You think this might be the person from the important recent project. Which statement is closest to how you would react?

- I would think this person was silly spending so much time talking to my partner and carry on with what I was doing.
- I would get a drink and then go and introduce myself to the stranger and chat with them and my partner.
- I would feel upset, would walk casually over and join in with their conversation in order to try to find out who the attractive stranger was.
- I would feel upset and I would walk over and ask to speak to my partner urgently in order to move them away from this situation.

5. Later on at the same party, you notice out of the corner of your eye that your partner is dancing closely with the same attractive female, who you now know is the person from the project. Which statement is closest to how you would react?

- I would think that my partner and their colleague looked silly dancing together and carry on with my conversation.
- I would want to keep an eye on my partner so I would carry on with what I was doing but move a little closer to the dancing.
- I would feel upset and would go and try to distract my partner and get their attention.
- I would feel upset and would signal to my partner to come over. I would tell them I was annoyed with them for dancing with this person and tell them to stop.

Appendix B (continued)

6. Towards the end of the party, you are sitting in a group talking with people from the party. You notice that your partner is only paying attention to the colleague from the work project. You see your partner laughing and touching this person on the knee. Which statement is closest to how you would react?

- I would think that my partner and their colleague were embarrassing themselves and carry on with my conversation.
- I would discreetly ask to have a quiet word with my partner and tell them I was feeling uncomfortable with their behaviour.
- I would feel upset and would try to sit closer to my partner and join in with their conversation and find out what was so funny. I would touch my partner by holding their hand or similar.
- I would feel upset and show this by walking out of the party straight past my partner and the colleague.

7. The next morning your partner goes out to the supermarket. You see their mobile phone on the kitchen table and then you hear it sound three

times that texts have arrived. You can see that the texts are from the attractive female work colleague. Which statement is closest to how you would react?

- I would think that this work colleague was pathetic and desperate and carry on with what I was doing.
- I would notice the phone but would respect my partner's confidentiality. I would plan to speak to my partner about it when we next saw each other.
- I would feel upset and start to think about the content of the texts and play this over in my mind. I would then check the phone but be very careful my partner would never find out.
- I would feel very upset and a strong need to check what was on the phone and then go through all the calls, texts and emails.

8. You start to have suspicions that your partner might be having a romantic relationship with the work colleague. When looking through a pile of papers for something else you find a hotel receipt. The date on the receipt is for a weekend when your partner told you they were visiting family. Which statement is closest to how you would react?

- Other things in my life are far more important than my relationship, so I would move on from this.
- I would feel upset and talk to my partner about this. I would tell them how I felt and question them about their feelings and actions.

Appendix B (continued)

- I would feel really upset, be constantly thinking about the possibility of the affair and would start to look for more 'evidence' that might prove my suspicions. I would want to be close to my partner and do things to show them how much I loved them.
- I would feel really upset and might yell and curse at my partner and accuse them of wanting the other person more than me. I would not want them to come near me.

Appendix C

Example of business card handed out at OCD Action conference

Appendix D

OCD Action website study recruitment advert

ocdaction

NEWS FORUM OCD QUIZ MEDIA DONATE CAMPAIGN MORE

support@ocdaction.org.uk
0845 390 6232

Home » Emotions in romantic relationships (Chance to win one of three £15 gift vouchers)

Emotions in romantic relationships (Chance to win one of three £15 gift vouchers)

The University of Sheffield – Research by Ella Woods, Professor Peter Totterdell and Dr Stephen Kellett.

What is the study about?

You are invited to participate in a study exploring emotions in adult romantic relationships. The purpose of this study is to develop a new way of exploring and assessing these emotions. The research aims to contribute to improvements in how we understand emotions in romantic relationships and improve the treatment for people who suffer problems within their romantic relationships.

What would I be asked to do?

Complete an anonymous on-line questionnaire that takes approximately 15 minutes (although there

Appendix D (continued)

is no time limit).

Who can take part?

We are looking for adults (aged 18+) either with or without symptoms of Obsessive Compulsive Disorder. We ask that you are:

Either Currently in a romantic relationship;

Or Have experienced a romantic relationship in the past that has lasted one month or more.

How do I take part?

You can access the survey by following the link below:

https://sheffieldpsychology.eu.qualtrics.com/SE/?SID=SV_07F5g2RCpydRTdH

This link will also give you details about the projects ethical approval and how we will protect your confidentiality and anonymity. You can also find out about the FREE PRIZE DRAW and your chance to win one of three £15 Amazon vouchers.

If you have any comments or questions, please contact the principal researcher Ella Woods on ewoods2@sheffield.ac.uk.

Thank you for your time; it is greatly appreciated.

Appendix E

Student recruitment advert

You are invited to participate in a study exploring emotions in adult romantic relationships. The purpose of this study is to develop a new way of exploring and assessing these emotions.

The research aims to contribute to improvements in how we understand emotions in romantic relationships and improve the treatment for people who suffer problems within their romantic relationships.

What would I be asked to do?

Complete an anonymous online questionnaire that takes approximately 15 minutes.

Who can take part?

We are looking for adults (aged 18 and over) either-

-you are currently in a romantic relationship; or

-you have experienced a romantic relationship in the past that has lasted one month or more.

How do I take part?

You can access the survey by following the link below:

https://sheffieldpsychology.eu.qualtrics.com/SE/?SID=SV_07F5g2RCpydRTdH

This link will also give you details about the project's ethical approval and how we will protect your confidentiality and anonymity. You can also find out about the free prize draw and your chance to win one of three 15GBP Amazon vouchers.

Project contact: This research is being conducted by Ella Woods (ewoods2@sheffield.ac.uk), under the supervision of Peter Totterdell (p.totterdell@sheffield.ac.uk) and Steve Kellett (s.kellett@sheffield.ac.uk). If you have any questions, then please contact Ella Woods initially.

All responses will be strictly anonymous and confidential. You may withdraw from the study at any point. This study has been approved by the Department of Psychology's Research Ethics Committee and is being carried out under the

Appendix E (continued)

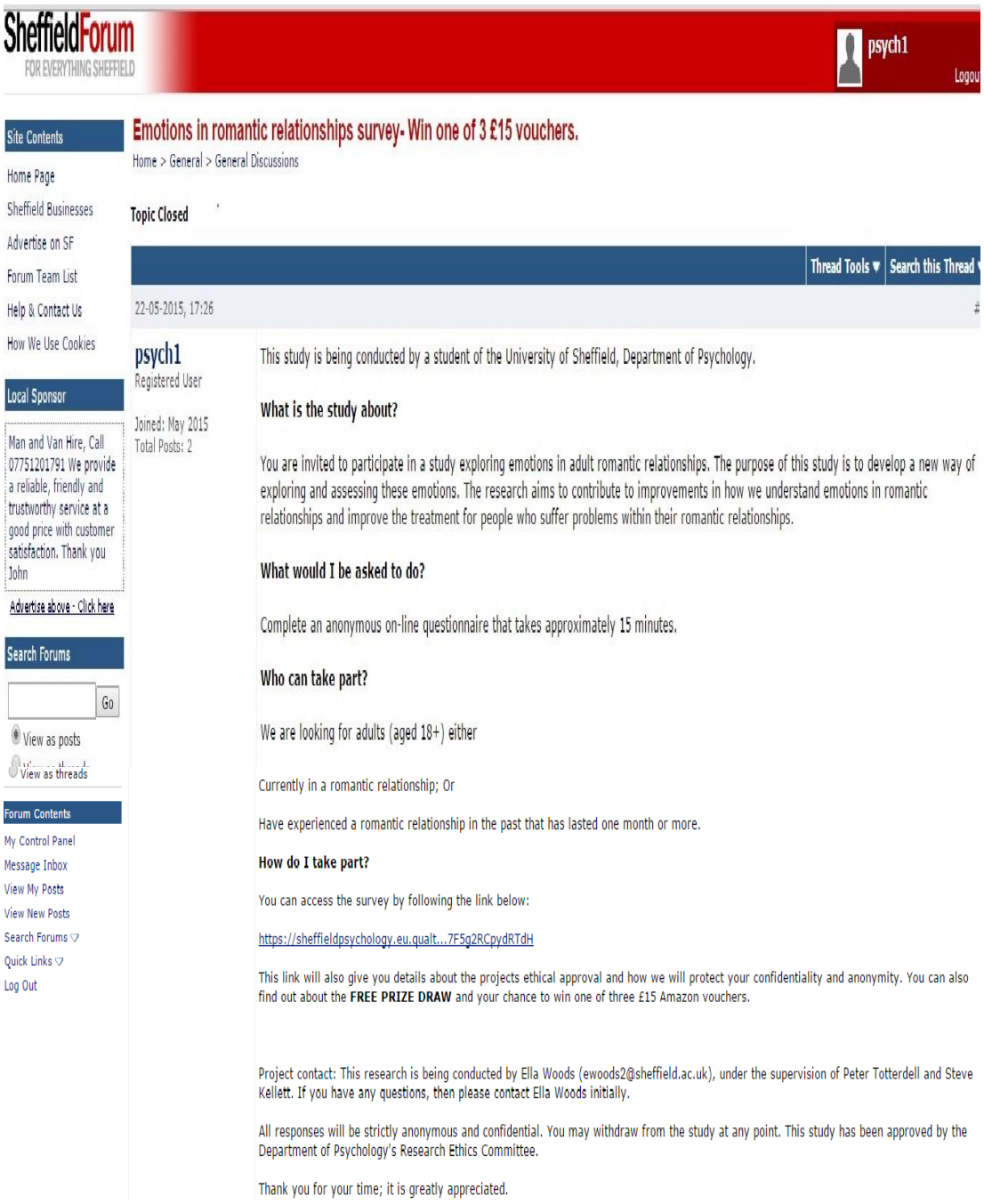
supervision of Professor Peter Totterdell and Dr Steve Kellett. Thank you for your time; it is greatly appreciated.

Information related to this message is available at https://sheffieldpsychology.eu.qualtrics.com/SE/?SID=SV_07F5g2RCpydRTdH.

For information about this email list, including how to remove your name, please visit https://www.sheffield.ac.uk/cics/email/distributionlists.html and click the list name.

Appendix F

Community recruitment advert (Sheffield Forum)



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Emotions in romantic relationships survey- Win one of 3 £15 vouchers.

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22-05-2015, 17:26 #

psych1
Registered User

Joined: May 2015
Total Posts: 2

This study is being conducted by a student of the University of Sheffield, Department of Psychology.

What is the study about?

You are invited to participate in a study exploring emotions in adult romantic relationships. The purpose of this study is to develop a new way of exploring and assessing these emotions. The research aims to contribute to improvements in how we understand emotions in romantic relationships and improve the treatment for people who suffer problems within their romantic relationships.

What would I be asked to do?

Complete an anonymous on-line questionnaire that takes approximately 15 minutes.

Who can take part?

We are looking for adults (aged 18+) either

Currently in a romantic relationship; Or

Have experienced a romantic relationship in the past that has lasted one month or more.

How do I take part?

You can access the survey by following the link below:

https://sheffieldpsychology.eu.qualt...7F5g2RCpydRTdH

This link will also give you details about the projects ethical approval and how we will protect your confidentiality and anonymity. You can also find out about the **FREE PRIZE DRAW** and your chance to win one of three £15 Amazon vouchers.

Project contact: This research is being conducted by Ella Woods (ewoods2@sheffield.ac.uk), under the supervision of Peter Totterdell and Steve Kellett. If you have any questions, then please contact Ella Woods initially.

All responses will be strictly anonymous and confidential. You may withdraw from the study at any point. This study has been approved by the Department of Psychology's Research Ethics Committee.

Thank you for your time; it is greatly appreciated.

Appendix G

University ethical approval

---------- Forwarded message ----------
From: **Psychology Research Ethics Application Management System** <no_reply@psychologyresearchethicsapplicationmanagementsystem>
Date: 24 February 2015 at 09:01
Subject: Approval of your research proposal
To: P.Totterdell@sheffield.ac.uk

Your submission to the Department of Psychology Ethics Sub-Committee (DESC) entitled "Real time behavioural choices during jealousy-provoking situations." has now been reviewed. The committee believed that your methods and procedures conformed to University and BPS Guidelines.

I am therefore pleased to inform you that the ethics of your research are approved. You may now commence the empirical work.

Yours sincerely,
Dr Tom Webb

Chair, DESC

Appendix H

Participant information sheet

Invitation

You are being invited to take part in this research project. Before you decide to do so, it is important you understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

What is the study about?

You are invited to participate in a study exploring emotions in adult romantic relationships. The purpose of this study is to develop a new way of exploring and assessing these emotions. The research aims to contribute to improvements in how we understand emotions in romantic relationships and improve the treatment for people who suffer problems within their romantic relationships.

Who is conducting the study?

The study is being conducted by Ella Woods (trainee clinical psychologist) with the support of research supervisors based within the psychology department of the University of Sheffield. The study will form part of the requirements for the Doctor of Clinical Psychology degree of Ella Woods.

What does the study involve?

If you wish to participate, you will be asked to complete a **15 minute on-line survey.**

How will my privacy be protected?

The information gathered from this survey is confidential and anonymous. When you submit your completed survey no names or email addresses will be attached.
The results will be published in an aggregated format in the researcher's doctoral thesis and in peer reviewed journals. However, no individuals will be identified in any publication of results. The data obtained will be stored and accessed only by the investigating researcher and supervisors. The anonymous data you provide may be used in future research.

Appendix H (continued)

Is my participation voluntary?

Participation in this study is entirely voluntary. If you do decide to participate, you are free to withdraw at any time without having to give a reason and without consequence.
The ethical aspects of this study have been approved by the Department of Psychology Ethics Sub-Committee at the University of Sheffield.

How can I enter the free prize draw?

At the end of the survey you will be invited to leave your name and email address to be entered into a free prize draw to win one of three £15 Amazon vouchers. The draw will close at midnight on the 01.11.2015. Any entrants after this date will not be counted. The three winners will be chosen at random on the 07.11.2015. Winners will be contacted by Ella Woods soon after. You do not have to complete the survey to be entered into the prize draw.

Will I experience any discomfort when I participate?

IMPORTANT: The subject matter of the survey questions will ask you to remember the emotions you have experienced within romantic relationships, some of these may have been distressing for you. While we encourage you to complete the entire survey, you do not have to answer all questions. The last page of the on-line survey provides you with a list of helpful contact numbers and resources.

Who can I contact if I have questions about the study?

Ella Woods can assist you with any inquiries about the use of the data or the survey itself. She also welcomes any of your comments about the completion of the survey. Please feel free to contact her on: ewoods2@sheffield.ac.uk

If you have a complaint about the study please initially contact the chief investigator Ella Woods or her research supervisors Peter Totterdell on: p.totterdell@sheffield.ac.uk or Steve Kellett on: s.kellett@sheffield.ac.uk . If you feel that your complaint has not been handled to your satisfaction then please contact the office of the Registrar and Secretary. The University of Sheffield's Registrar and Secretary is Dr Philip Harvey. He can be contacted at the following address: Dr Philip Harvey, The Registrar and Secretary's Office, University of Sheffield, Firth Court, Western Bank, Sheffield S10 2TN, UK.

Appendix H (continued)

I agree to participate in this research, knowing that:

- I have read the information sheet and have had the opportunity to contact the researcher if I have any questions.

- That my participation is voluntary and I am free to withdraw at any time without giving a reason and without there being any negative consequences.
- I understand that my responses will be kept strictly confidential.
- I agree for the data collected from me to be used in future research
- I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the report or reports that result from the research.

Appendix I

End of survey summary sheet

END OF SURVEY

Thank you for taking part in my survey. **Please press continue to submit your results.**

The main aim of this study is to develop a scenario-based measure of jealousy. Effective methods for assessing and capturing the decision-making process of people experiencing jealousy are few and far between. This means that there is no standard or commonly used treatment approach for people experiencing pathological jealousy. Due to the lack of understanding of pathological jealousy there is a reliance on pharmacological treatment. This study aims to further the understanding of jealousy by focusing on the behavioural choices individuals make when faced with jealousy provoking scenarios. The study also aims to contribute something new to the understanding of jealousy by examining the role of impulsivity. If impulsivity has a role in the experience and expression of jealousy then the extensive research pertaining to pharmacotherapy for impulsivity might provide insight into the treatment of jealousy.

Support

If you would like further support related to the topics raised in this survey the following organisations may be of help:

Relate : Largest UK provider of relationship support.
Web site: http://www.relate.org.uk/
Telephone: 0300 100 1234

OCD Action: National charity provding support and inormation for anybody affected by Obsessive-Compulsive Disorder.
Web site: www.ocdaction.org.uk
Telephone: 0845 390 6232

OCD-UK: National charity working with and for children and adults whose lives are affected by Obsessive-Compulsive Disorder.
Web site: http://www.ocduk.org/
Telephone: 0345 120 3778

Appendix I (continued)

Any questions?

Please contact Ella Woods on ewoods2@sheffield.ac.uk

Prize draw

If you wish to be entered into the free prize draw **please press continue** to enter your details. There will be three £15 Amazon vouchers on offer. The draw will be closed at midnight on 01.11.2015. Any entrants after this date will not be counted. The winners will be chosen at random on 07.11.2015. The winners will be contacted by Ella Woods soon after the draw and arrangements can be made to receive your prize.

If you do not wish to enter the prize draw please press continue to finish the survey.

Appendix J

Short-Form Multidimensional Jealousy Scale (SF-MJS)

Please answer the following questions with your current romantic partner in mind. If you are not currently in a relationship then please answer with your most recent romantic partner in mind**.**

How often have the following thoughts occurred?	**1 Never**	**2**	**3**	**4**	**5**	**6**	**7 All the time**
1. I suspect that X is secretly seeing someone romantically							
2. I suspect that X may be attracted to someone else							
3. I suspect that X may be physically intimate with another person							
4. I think that X is secretly developing an intimate relationship with another person							
5. I suspect that X is crazy about other people							
Please rate your emotions in the following situations	**1 Very pleased**	**2**	**3**	**4**	**5**	**6**	**7 Very Upset**
6. X comments to you on how great looking a particular person is							
7. X shows a great deal of interest or excitement in talking to someone							
8. A person if trying to get close to X all the time							
9. X is flirting with someone else							
10. Someone is dating X							
11. X hugs and kisses someone else							
How often have you engaged in the following behaviours?	**1 Never**						**7 All the time**
12. I look through X's drawers, handbag, or pockets.							
13. I call X unexpectedly, just to see if he or she is there.							

Appendix J (continued)

How often have you engaged in the following behaviours?	1 Never						7 All the time
14. I question X about previous or present romantic relationships.							
15. I question X about their telephone calls.							
16. I question X about their whereabouts.							
17. I join in whenever I see X talking to another person.							

Appendix K

Experience in Close Relationships-Short Form (ECR-SF)

Instruction: The following statements concern how you feel in romantic relationships. We are interested in how you generally experience relationships, not just in what is happening in a current relationship. Respond to each statement by indicating how much you agree or disagree with it. Mark your answer using the following rating scale:

1	2	3	4	5	6	7
Strongly Disagree	**Disagree**	**Slightly Disagree**	**Netural**	**Slightly Agree**	**Agree**	**Strongly Agree**

1. It helps to turn to my romantic partner in times of need.
2. I need a lot of reassurance that I am loved by my partner.
3. I want to get close to my partner, but I keep pulling back.
4. I find that my partner(s) don't want to get as close as I would like.
5. I turn to my partner for many things, including comfort and reassurance.
6. My desire to be very close sometimes scares people away.
7. I try to avoid getting too close to my partner.
8. I do not often worry about being abandoned.
9. I usually discuss my problems and concerns with my partner.
10. I get frustrated if romantic partners are not available when I need them.
11. I am nervous when partners get too close to me.
12. I worry that romantic partners won't care about me as much as I care about them.

Appendix L

Obsessive Compulsive Inventory- Revised (OCI-R)

The following statements refer to experiences that many people have in their everyday lives. Circle the number that best describes HOW MUCH that experience has DISTRESSED or BOTHERED you during the PAST MONTH. The numbers refer to the following verbal labels:

0	1	2	3	4
Not at all	**A little**	**Moderately**	**A lot**	**Extremely**

1. I check things more often than necessary.
2. I find it difficult to control my own thoughts.
3. I repeatedly check doors, windows, drawers, etc.
4. I am upset by unpleasant thoughts that come into my mind against my will.
5. I repeatedly check gas and water taps and light switches after turning them off.
6. I frequently get nasty thoughts and have difficulty in getting rid of them**.**

Appendix M

The Barratt Impulsiveness Scale (BSI-11)

DIRECTIONS: People differ in the ways they act and think in different situations. This is a test to measure some of the ways in which you act and think. Read each statement and put an X on the appropriate circle on the right side of this page. Do not spend too much time on any statement. Answer quickly and honestly.

① Rarely/Never ② Occasionally ③ Often ④ Almost Always/Always

1	I plan tasks carefully.	①	②	③	④
2	I do things without thinking.	①	②	③	④
3	I make-up my mind quickly.	①	②	③	④
4	I am happy-go-lucky.	①	②	③	④
5	I don't "pay attention."	①	②	③	④
6	I have "racing" thoughts.	①	②	③	④
7	I plan trips well ahead of time.	①	②	③	④
8	I am self controlled.	①	②	③	④
9	I concentrate easily.	①	②	③	④
10	I save regularly.	①	②	③	④
11	I "squirm" at plays or lectures.	①	②	③	④
12	I am a careful thinker.	①	②	③	④
13	I plan for job security.	①	②	③	④
14	I say things without thinking.	①	②	③	④
15	I like to think about complex problems.	①	②	③	④
16	I change jobs.	①	②	③	④
17	I act "on impulse."	①	②	③	④
18	I get easily bored when solving thought problems.	①	②	③	④
19	I act on the spur of the moment.	①	②	③	④
20	I am a steady thinker.	①	②	③	④
21	I change residences.	①	②	③	④
22	I buy things on impulse.	①	②	③	④
23	I can only think about one thing at a time.	①	②	③	④
24	I change hobbies.	①	②	③	④
25	I spend or charge more than I earn.	①	②	③	④
26	I often have extraneous thoughts when thinking.	①	②	③	④
27	I am more interested in the present than the future.	①	②	③	④
28	I am restless at the theater or lectures.	①	②	③	④
29	I like puzzles.	①	②	③	④
30	I am future oriented.	①	②	③	④

Patton, Stanford, Barratt (1995). *J Clin Psy*, vol. 51, pp. 768-774

Appendix N

Calculation instructions to categorise participants into attachment groups based on their ECR-SF score – Provided by Fraley (2012).

Note: M= Median, ANX= ECR-SF Anxiety score, AVOID= ECR-SF Avoidance score.

(a) if the person's anxiety score is < MANX and the person's avoidance score is < MAVOID, then assign him or her to the secure group.

(b) if the person's anxiety score is < MANX and the person's avoidance score is >= MAVOID, then assign him or her to the dismissing group.

(c) if the person's anxiety score is >= MANX and the person's avoidance score is >= MAVOID, then assign him or her to the fearful group.

(d) if the person's anxiety score is >= MANX and the person's avoidance score is < MAVOID, then assign him or her to the preoccupied group.