

AN INVESTIGATION INTO THE STRUCTURE OF JEALOUSY, AND ITS
RELATIONSHIP TO INTERPERSONAL SUSPICION

by

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ABSTRACT

This thesis aims to trace one feature — interpersonal suspicious thought — in order to better understand jealousy, and its relationship to other kinds of suspicious thought in non-clinical populations. Chapter 1 offers an overview of jealousy and its clinical and forensic importance. Chapters 2 and 3 review the jealousy literature and theory, and offer critiques and areas to examine further, such as, the role of abnormal cognitive processes, negative affect, and in particular, psychosis-like thought. Chapter 4 explores jealousy's structure and its relationship to paranoid ideation and finds indications of a shared, cumulative, latent, psychosis-like structure. Chapter 5 further examines the structure of jealousy found in Chapter 4 and confirms the cumulative structure and jealousy's overlap with paranoia. Chapter 6 investigates how irrational processes, including jealousy, arise, evolve and impact couple relationships in real time. The study found that interpersonal socio-cognitive processes, such as intuition, appear to play a role in irrational thought formation and maintenance and may have a role in both functional and dysfunctional relationship processes. Chapter 7 summarises the thesis and integrates theory to build a new model of the jealousy process. The results of the thesis are discussed in terms of both implications for practice and directions for future research.

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CHAPTER 1. INTRODUCTION

This thesis concerns jealousy. More specifically, it explores the complex set of dynamic processes involved in jealousy. Furthermore, it will explore consistency in findings between methods used in different fields in order to establish whether jealousy and paranoia could be indicative of an underlying psychotic process. This thesis will also explore transferability, looking at the data in relation to established processes found in other areas of psychosis research.

There are a number of qualifying terms which are often associated with jealousy in the literature. These are: romantic, marital, spousal, and emotional. This suggests that there are different kinds of jealousy, or different contexts in which jealousy might be meaningful. 'Romantic jealousy' may be the most widely used form of the term. The Oxford English Dictionary defines romantic jealousy as, "feeling or showing a resentful suspicion that one's partner is attracted to or involved with someone else". It is etymologically derived from the Greek and Latin words for zeal, in the sense of great energy or enthusiasm in pursuit of an objective. This became the Old French word '*gelos*', related to "keen, or zealous" but then took on connotations of romantic possessiveness and suspiciousness.

Definitional inconsistency centres on whether jealousy is seen as an emotion, thought, behaviour, or process. Mullen (1991) suggested that these may be viewed as components of a syndrome. Further definitional inconsistency arises from the frequent use of envy and romantic jealousy as synonymous terms when they refer to discrete phenomena¹; (for an extended discussion see Salovey, 1991 pp. 23-27), and that the

¹ For example, envy refers to something one lacks oneself, whereas jealousy refers to the loss of a relationship one has. Jealousy concerns relationships with other people, whereas envy extends to characteristics and possessions.

term jealousy is also used in relation to other (i.e., non-romantic) relationships (e.g., sibling relationships) where it is often viewed as the same construct but without sufficient evidence to support this (Stearns, 1989).

This thesis views irrational jealousy as unfounded suspicions of a romantic partner's fidelity that are unsubstantiated by any reliable evidence, or as an excessive response to minor jealousy-provoking situations that modify thoughts, feelings and behaviours (Bringle, 1991). A caveat is that the irrationality (or not) of jealousy is not always clear, and to assume seemingly unevidenced claims as irrational may be problematic as infidelity is likely to be concealed, unless there is mutual consent (e.g., in polyamorous relationships) (Mullen & White, 1991).

Jealousy is interesting both clinically and from a forensic perspective as it is frequently involved in general aggression (Archer & Webb, 2006), intimate stalking (Roberts, 2005) and partner violence and homicide (Dobash et al., 2009). Jealousy and paranoia co-occur in people who are generally aggressive, or partner aggressive. These are psychological risk factors with the highest effect size in partner aggressive populations (Capaldi, Knoble, Shortt, & Kim, 2012; Stith, Smith, Penn, Ward, & Tritt, 2004). Furthermore, paranoia and jealousy frequently co-occur with other forms of psychosis (Soyka, 1995). What is notable is that the exact relationship between jealousy and paranoia has not been more frequently or fully explored.

Previous explorations of how jealousy and paranoia might be related, focus on jealousy as a symptom of a number of discrete mental illnesses (e.g., Borderline personality disorder, Kingham & Gordon, 2004). However, both jealousy and paranoia appear to share a common symptom of irrational, social suspiciousness – which may suggest their co-occurrence is related to an underlying common cause. However, whilst

paranoia is generally understood to be delusional, problematic jealousy is not. It is not certain why this should be, as a main characteristic of irrational jealousy is the focus on false beliefs concerning a partner (Maggini et al., 2006).

Jealousy and paranoia also share similar characteristics in terms of phenomenology (e.g., the presence of interpersonal suspicious thoughts, intrapersonal ruminative thoughts, false accusations and interrogative and aggressive interpersonal behaviours, see Chapter 2). Furthermore, according to DSM IV delusions or irrational thinking in both jealousy and paranoia is focussed on aspects of social relationships or social function (American Psychiatric Association, 1994). It is therefore interesting that jealousy and paranoia have only been associated in relation to unusual psychiatric syndromes (e.g., Othello Syndrome, Cipriani et al., 2012) and have not been studied in relation to their potential for common underlying social cognitive pathology in less severe clinical, forensic or normal populations.

Many psychotic syndromes such as schizophrenia, paranoid and schizoaffective disorders share similar characteristics, with some central features, generally referred to as positive and negative symptoms (Watson & Tellegen, 1985). The aim of this thesis is to trace one particular feature of psychotic syndromes - interpersonal suspicious thinking - in order to explore the potential links with jealousy. In particular, I will explore links to the type of jealousy that has been termed in the literature as suspicious, irrational or pathological jealousy. The principal assumption tested in this thesis is that paranoia and jealousy are genuinely co-morbid, i.e., the co-occurrence of these two discrete syndromes, rather than just being co-existent, is indicative of some underlying latent mechanism (causal factor).

This thesis is focussed on jealousy in the general population. It refers jealousy

that results in behaviour that might be reasonably considered destructive to either the partner or the relationship. The term pathological jealousy, which is often used to refer to problematic jealousy, is not wholly compatible with this notion. Pathological jealousy is referred to frequently in theory however, most empirical studies of pathological jealousy refer to rare case studies (e.g., Bhandari, 2012), which tells us little about what might cause unhelpful jealousy in most clinical cases, or in the normal population.

Paranoid ideas are present on a continuum of severity in the general population, and for some people these ideas appear to become more exaggerated and persistent resulting in what appears to be sub-clinical paranoia, and in turn, may manifest as a clinical syndrome (van Os et al., 2009). What is also evident is that all types of pathological or suspicious jealousy, briefly mentioned above and discussed in more detail in subsequent chapters, also share the characteristic of unwarranted, exaggerated, persistent negative assumptions about the intentions or actions of another person (Maggini et al., 2006); these ideas relate predominately to social cognition.

Whilst the aim of this thesis is not to suggest that all jealousy, nor all paranoid thought, is clinical or pathological, it is proposed that suspicious jealousy is distinct from normal jealousy in cause and form, but that it shares a common cause and form (marked by irrational thinking), with other forms of delusion/ideation and differs only in terms of theme (content). It is hypothesised that problematic interpersonal outcomes, such as aggression (Dobash et al., 2009) and poorly managed conflict escalation in couples (Teismann & Mosher, 1978), which have been related to jealousy as a whole, are explained by and result from this single form of jealousy with its latent psychosis-like process.

This thesis explores in Chapter 3 the theoretical, and in Chapters 2 and 4 –6, the

empirical basis for suggesting that paranoia and suspicious jealousy arise from a common latent psychosis-like process that occurs on a continuum of severity, frequency and intensity, and leads to disorganised and bizarre thinking. By first exploring the shared features (e.g., age of onset, comorbidity), presumed aetiology, physiopathology, clinical course, familial history, and response to pharmacological and behavioural treatments, in Chapter 2. Then exploring whether the traditional view of paranoia and suspicious jealousy as two discrete entities with different aetiologies or whether an alternative is responsible for both syndromes. Then evaluating alternative explanations to determine whether evidence and theory are consistent with a psychotic continuum model. Finally, within Chapters 6 and 7 it explores whether irrational beliefs of this kind should be understood with reference to social cognitive processes. If this is so, social cognitive processes should be included in any model of jealousy and also in those that explore paranoid delusions or irrational beliefs.

Overview of Chapters

Chapter 2. Systematic Review. Chapter 2 will provide an overview of prior empirical research into suspicious forms of jealousy. It will then explore the concepts and facets related to both paranoia and jealousy to determine if parallels can be drawn between jealousy and paranoia in support of the idea of a suspicious form of jealousy characterised by a combination of behaviour, cognition and emotion, using a systematic search of the literature. It will then map the extent and type of variables and characteristics that have been related to jealousy, and finally it will explore the relationship between jealousy and paranoia in order to understand whether these concepts are describing a similar phenomenon. Three key questions were examined: 1. What evidence is there that suspicious jealousy may be a focal theme of paranoid delusion/ideation in normal, clinical and forensic populations? 2. What are the

similarities and differences between the characteristics, phenomenology of paranoia and suspicious or excessive jealousy? 3. What are the cognitive, affective and behavioural consequences and mental health correlates and how might these result from paranoia or jealousy?

Results suggest that jealousy is a syndrome with a combination of emotional, cognitive and behavioural characteristics that, in its suspicious form, shares many features with other forms of irrational social cognition, such as paranoia and persecutory thinking. This chapter informs the theory chapter and provides the basis for the rest of this thesis, as subsequent chapters will explore the elements that form jealousy, the underlying structure of jealousy and test the relationships between elements that form jealousy and paranoid processes.

Chapter 3. Jealousy Theory. Chapter 3 begins with an examination of jealousy definitions and then goes on to critically evaluate descriptive and explanatory theories of jealousy and explores the potential links with psychosis.

This chapter will review and evaluate influential theories of jealousy. The sub-questions to be answered by this theoretical review are: 1. What is jealousy comprised of and how might it be organised? 2. What do the most influential theories of jealousy suggest causes jealousy, by which mechanisms and how they are sequentially organised in order to cause the onset and maintenance of jealousy? 3. How do the suggested causes result in the differing affective, cognitive and behavioural outcomes proposed by theory and research? 4. How is irrational thinking explained by jealousy theory, what causes it and how does this interact with other risk factors to produce behavioural outcomes? This chapter will conclude by exploring the adequacy and gaps in existing theory and suggests some ways in which theory could be developed and potential

avenues for empirical work that provide the theoretical basis for the rest of the thesis, informing the questions asked in the subsequent empirical research.

Chapter 4. The Structure of Jealousy. Chapter 4 will apply Multidimensional Scaling (MDS) to explore the structure of both jealousy and paranoia and compare this to the structures suggested by existent jealousy theories reviewed in the previous two chapters; determine if jealousy is structured in a similar way to psychosis; and explore how items are distributed within four of the most frequently used and robust measures of jealousy and paranoia, in a population of non-clinical adults. This chapter asks 1. What are the facets/dimensions of jealousy? 2. What are the facets/dimensions of paranoia? 3. Is there an overlap or consistency between both of these that could indicate an underlying psychotic dimension?

Analysis of the individual jealousy scales indicated that jealousy is cumulative with an escalation process comprising of six facets that relate to aspects of negative affect and personality traits. The individual paranoia scales replicate the cumulative structure suggested by Johns and Van Os (2001), and the relationship of escalation to anxiety (Freeman & Fowler, 2009) is also confirmed by the structure. The radex pattern (Guttman, 1954) in the dimensions of jealousy indicates that jealousy may be cumulative and processual, evolving from responses to well-evidenced threats to a romantic relationship, to irritation/anger, fear/neurosis, suspiciousness, followed by intrusiveness and then invasiveness accompanied by strong conviction to a jealous or paranoid idea. The structure is theoretically similar to other models of psychosis (Freeman, Garety, Kuipers, Fowler, & Bebbington, 2002). This suggests that the construal of jealousy as a discrete dimension is unlikely and gives some support that suspicious forms of jealousy may follow a psychotic process and that a cumulative,

processual theory of jealousy would be appropriate. The next chapter will further explore the cumulative properties of both jealousy and paranoia scales that were indicated in this chapter and determine which items and facets are related to more and less severe forms of jealousy and paranoia.

Chapter 5. Rasch Analysis of Jealousy and Paranoia. Chapter 5 builds on Chapter 4 and explores the cumulative nature of both paranoia and jealousy as indicated by the MDS. It will delineate which items in this data set are related to relatively less and more jealousy and the relationship to paranoia. It will also explore whether there is evidence to support an underlying latent dimension for both irrational jealousy and paranoid thought.

The aim of this chapter is to explore the cumulative nature of both paranoia and jealousy by using a Rasch analysis and to gain a greater understanding of affect, cognition and behaviours that are related to the severity and nature of jealousy experience and behaviour. Five questions will be examined: 1. Is jealousy cumulative in nature? 2. Which items indicate more and less jealousy? 3. Is paranoia also cumulative in nature? 4. Which items indicate more and less paranoia? 5. What is the cumulative structure of the suggested psychotic process in the combined jealousy and paranoia items, and is this indicative of an underlying psychotic dimension, or dimensions?

The findings suggest that severe suspicious jealousy is indicated by its relationship to persecutory ideation, belief certainty and invasive and detective behaviours; that suspiciousness escalates due to increasing anxiety; and that this process is linked to a bias toward ambiguous or minor evidence of infidelity. Also, that behavioural markers of increasing jealousy are interrogative behaviours related to distress, and self-referent thought. Furthermore, that normal jealousy is distinguished by

substantiated evidence of infidelity or relationship threat and the absence of anxiety. The chapter then discusses omissions from the scales and areas for development.

This chapter will explore the cumulative structure of jealousy and paranoia. The following chapter will explore whether the processes established in the structural and cumulative analysis in Chapters 3 and 4, are found in the conflict resolution strategies of people who are in functional romantic relationships. It also explores how suspicious thoughts might be managed during conflict in order to limit any adverse impact upon the couple relationship.

Chapter 6. Cued Recall Chapter 5 looked at the cumulative nature of jealousy within romantic relationships and evidence for a latent psychotic process. Chapter 6 uses a pluralist analysis to explore how functioning romantic couples manage relationship conflict.

The aim of this chapter was to explore, in real time, conflict resolution processes and transactions related to suspicious and irrational thinking within a dyadic framework from a number of different perspectives in order to determine: 1. Do irrational thought processes occur during conflict in functional couples and how do they evolve over time? 2. Can specific processes be identified that relate to the escalation or dismissal of suspicious thoughts? 3. How do these processes affect the discussion and the couple's relationship?

A novel qualitative methodology - cued recall – will be employed in order to explore how couples reflect upon their capacity to resolve conflicts in their relationships. This method will allow us to gain a greater understanding of typical conflict resolution in functioning (non-abusive) couples, in order to determine what

strategies people use to manage interpersonal conflict well; evaluate the theoretical models discussed in Chapters 3 and 4; and determine if the strategies used could be taught.

Firstly, are suspicious, unwarranted interpersonal cognitions phenomenologically similar to those found in psychosis, also found in conflict resolution experiences of functioning couples? In order to explore this idea, both irrational and experiential/intuitive thinking and rational reasoning styles will be identified in couple conflict discussions. How do personal beliefs change and evolve (or remain rigid) during the couple's conflict interaction and what contextual and interpersonal factors influence their evolution? Also, what do seemingly irrational beliefs mean for the individual from a phenomenological perspective? From a critical perspective, issues of power, voice and credibility within the dialogue will also be identified, to develop an alternative account of challenges and rationality within the couple relationship, using the principles of hermeneutic and epistemic injustice (Fricker, 2007). It will conclude by examining the contribution and sometimes-competing nature of each perspective and examine how processes hypothesised to be useful from one perspective (e.g., empathic processes) may be viewed as less functional from another perspective.

Paranoid and irrational thoughts were found to exist in functioning couple relationships. Findings show six distinct processes related to how partners understand intentions and the formation, modification and maintenance of irrational thinking within normal (non-abusive) couple relationships: 1. The use of emotional and intuitive reasoning rather than contextual and historical information; 2. Reflection and empathic effort; 3. Difficulty in dismissing understanding derived from intuition; 4. Avoidance of

responsibility-taking; 5. Deferent incorporation; 6. An acquired inability to reason due to not being believed. Findings also show that cued recall was a useful and novel method for exploring couple processes related to suspicious and irrational interpersonal thought and has potential for enabling empathic effort.

Chapter 7. General Discussion and Conclusions. The overall aim of this thesis was to examine the relationship between irrational thinking in jealousy and paranoia, determine whether there is sufficient evidence to indicate a single, latent psychotic dimension underlying both phenomena. Chapter 7 will discuss how the thesis has answered the questions originally posed by assessing the contribution of each study and evaluating the overall findings in relation to the theory developed. It explores alternative theories related to irrational thinking that might better explain and account for the apparent latent psychotic dimension established in the previous empirical chapters, and builds on jealousy theory to suggest potential mechanisms for how affective, cognitive and situational factors may interact and produce situational couple outcomes, such as aggression and also prior psychological vulnerability to psychotic states. This chapter uses two techniques: the *theory knitting perspective* proposed by Kalmar and Sternberg (1988); and *facet theory* proposed by Guttman (1971), to extend and guide the development and refinement of existing jealousy theory. More specifically, it proposes explanations of irrational jealousy, i.e., its form, how it might arise, escalate and its role in partner conflict; integrating prior theoretical understanding (Chapter 3) and ensuring comprehensive coverage of empirically established (Chapter 2) or theoretically plausible risk factors to some of the core assumptions proposed by this theory.

It proposes a new integrated model to encompass both the strengths of prior theories/models and to address some of the limitations of these models. The overall aim

was to create a multifactorial model that both matches the empirically derived risk factors and findings from the systematic review of prior jealousy research. The model suggests specific mechanisms and processes related to empirically derived distal risk markers and proximal triggering events and provides an explanation as to how these interact to produce the observed outcomes of suspicious jealousy.

This final chapter will then discuss the implications of these findings and how they might be practically applied to support couples and individuals. This will be followed by a discussion of the strengths and limitations of the work and future research directions.

CHAPTER 2: PARANOID PROCESSES AND PSYCHOLOGICAL MECHANISMS IN IRRATIONAL JEALOUSY: AN INTEGRATIVE REVIEW

Jealousy is not always problematic and can sometimes enhance a relationship and contribute to its longevity. For example, jealousy can motivate behaviours such as: increasing the provision of material resources; increasing verbal and physical affection shown towards partners (Buss, 1988); add romance to a dull relationship, or increase a person's recognition of their level of commitment to a relationship (Guerrero & Andersen, 1998, p. 66). However, heightened levels are linked to problematic outcomes, such as relationship difficulty and failure, personal distress, (Mullen & Martin, 1994), partner aggression (Capaldi et al., 2012; Langhinrichsen-Rohling, McCullars, & Misra, 2012; Stith et al., 2004) and partner homicide (Buteau et al., 1993; Morton, Runyan, Moracco, & Butts, 1998). Jealousy is generally understood to be heterogeneous, ranging from normal responses to relationship threats, to severe pathological forms (Parker & Barrett, 1997). However, the causes of jealousy are not well understood. This is indicated by the continued difficulty in distinguishing normal from pathological jealousy (Mullen & Martin, 1984); jealousy typologies (e.g., Buunk, 1991, 1997; Marazziti et al., 2010b) that do not appear to identify natural kinds (Boyd, 1991), as demonstrated by each type's lack of statistical independence, conceptual overlap; and the unreliable prediction of proposed outcomes. It has also resulted in a limited understanding of the mechanisms that create and maintain jealousy and how these result in adverse outcomes. Understanding the full scope of factors linked to pathological jealousy and new ways to understand what distinguishes pathological from normal forms would be useful for both researchers and clinicians. In this chapter, I will begin by outlining the scope, aims and approach taken in this review, followed by presentation of the findings and then finally draw conclusions as a result of this review.

The integrative pluralist approach (Kendler, 2005) suggests research should focus on single symptoms and the system that surrounds them. By mapping conditions onto their subprocesses and linking these to underlying mechanisms (Zachar & Kendler, 2007), this approach has proved useful in clarifying causes and developing research in other areas of pathology (e.g., Kendler, Gardner, & Prescott, 2006; Ward, 2014). Single symptom research may be useful in understanding irrational suspiciousness in jealousy. Jealousy that is based on observed threats to the relationship appears to be quite normative but where it is based on imagined infidelity with no sound evidence of a partner's actual or intended infidelity, (i.e., irrational, suspicious jealousy) it is a feature of all pathological partner jealousy (Bringle, 1991). This makes irrational suspiciousness a potentially useful focus of theory and research. Furthermore, suspiciousness, whilst an identifying feature of problematic jealousy, is not exclusive to jealousy, it is also a central characteristic of paranoia (DSM IV; APA, 1994).

Paranoia has three qualities in common with jealousy: it is interpersonal, it concerns the perception of others' intentions towards the self, and it concerns threat perception. Therefore, an analogy of jealousy with paranoia, with which has apparent similarity but where there has been notable progress in understanding (reviewed in the following sections) might help us to understand the processes underlying jealousy.

Social cognition and non-social cognition are found to be neurobiologically and empirically separable (Fett et al., 2011; Green et al., 2008). Furthermore, social cognition is found to contribute more to outcomes in psychotic illness (Fett et al., 2011) with the belief that another person intends to harm, distinguishing paranoia from social anxiety (Freeman & Garety, 2000). It is one way of dealing with threats to the self in social situations (Trower & Chadwick, 1995), and involves abnormal attributions about

social situations due to misinterpreting other's motives (Hewstone & Jaspars, 1987) with increasing severity indicated by the unlikelihood of the belief being true (Hanssen, Krabbendam, Vollema, Delespaul, & Van Os, 2006).

Paranoia involves misperceptions or misinterpretations² of circumstances or events that the person believes to be the truth and is a symptom of psychosis (Harvey & Walker, 1987). Paranoid, erroneous beliefs are held with a high degree of conviction, are inflexible and very resistant to change (Freeman, 2007). Paranoia is a characteristic of multiple psychiatric diagnoses (Bentall et al., 1988), includes multiple themes, e.g., fears that one is being threatened, and jealousy (DSM IV; APA, 1994). However, whilst the way that psychiatrists categorise paranoia might suggest it has different forms, clinical reports and research (e.g., Musalek et al., 1989) suggest that the form and process of paranoia remains the same regardless of theme or content.

Until recently, paranoia was not thought to exist in the general population and therefore it was researched only where it was the primary theme of severe psychiatric delusion. A growing body of research now suggests that both paranoid delusions and ideation exist sub-clinically in the general population (Claridge, 1972, 1987; Johns & Van Os, 2001) on a continuum of severity (Hanssen et al., 2006). Conservative estimates suggest paranoid thinking is present at varying levels of severity in at least 10-20% of the general population (Freeman, 2007; Johns et al., 2004). Findings show sub-clinical paranoia creates vulnerabilities to delusional beliefs, biased appraisals of interpersonal situations and interpersonal problems in many of the general population (Freeman et al., 2005). If irrational jealousy is a form of paranoia or a latent psychotic

² Misperception and misinterpretation are used here to refer to different processes. There is an established tradition in cognitive psychology where perception is thought to be a passive process and interpretation an active process. Respectively, a failure in acquiring data from stimuli and a failure to analyse correctly.

process, it may also form a continuum in the population, have a similar hierarchical structure of escalating severity, be present across diagnoses and populations, and have shared characteristics and outcomes. In order to decide if this analogy between jealousy and paranoia is useful, further research is essential.

People with psychosis or paranoia appear to think in a markedly different way from those who do not, and these differences are thought to contribute to distorted beliefs (Freeman et al., 2002; Garety et al., 2001). Different theories about what causes these differences have been suggested. For example, *theory of mind* (ToM) deficits (the ability to predict and understand others' intentions) have frequently been suggested to cause distorted thinking, (Maher, 1974; Williams, 1964). However, most people in the general population with delusions have intact ToM and have no evidence of other substantive cognitive or reasoning deficiency (Garety & Freeman, 1999; McCabe, Heath, Burns, & Priebe, 2002). Explanations that better fit current evidence suggest delusions arise due to multiple factors: including cognitive biases, reasoning errors, and erroneous attempts to make sense of internal arousal and anomalous experiences (Frith, 1992; Hemsley, 1994).

Safety behaviours, adaptations to thoughts and behaviours that help coping but also maintain negative emotional states, (see Clark, 1999), such as the desire to withdraw, or hostility and violence are frequent in people with paranoia (Freeman et al., 2007). People suffering from either delusions or ideation display similar processes in the onset and maintenance of unfounded beliefs (seeing others as persecutors, having little perceived control over the situation, and feeling deserving of harm (Freeman & Garety, 2004). Reasoning processes and safety-behaviours are critical contributors to irrational belief persistence (Freeman & Garety, 2004). Research on reasoning bias and

ruminative thoughts in less-severe forms of paranoia (e.g., persecutory thinking) suggests irrational thoughts arise from mechanisms related to suspiciousness (e.g., Broome et al., 2007). People with paranoia also appear to have difficulty in weighing evidence when decision-making (Hemsley & Garety, 1986), which is most likely due to: reasoning biases in data gathering (especially a ‘jumping to conclusions’ bias – the tendency to use a small amount of information to make a firm decision), a failure to consider alternative explanations (Freeman et al., 2004), a lack of disconfirmatory evidence seeking (Allen et al., 2005), and negatively-biased interpretations (Savulich et al., 2015).

Paranoia has both cognitive and affective elements, with irrational thinking appearing to result from a combination of ambiguous information, anomalous experience and heightened affect (Freeman & Garety, 2004). This often happens directly after distressing events (e.g., bullying, or interpersonal conflict) (Freeman, 2007), and is linked with low self-esteem (for a review see Freeman, 2007). In particular, fluctuations in self-esteem (Thewissen et al., 2007) and dysfunctional strategies to manage self-esteem (Thewissen et al., 2008), both precede increases in the level of paranoia (Thewissen et al., 2011). This effect has been observed transdiagnostically with delusional symptoms (Bentall et al., 2008). Those vulnerable to suspicious thoughts are thought to externalise internal events by using negative or ambiguous information as evidence when trying to make sense of unusual or distressing internal experiences (Freeman & Garety, 2004). The most likely explanation is people with paranoid thinking are making an inference that misattributes emotional experiences and feelings to the external situation (Grèzes, Frith, & Passingham, 2004). In summary, research finds cognitive biases, affective processes, poor emotional regulation and low self-esteem persistently link to paranoid ideation.

No previous integrative review of irrational jealousy has been undertaken, therefore, a review of existing research on reasoning in irrational, suspicious jealousy focussed on reasoning and cognitive biases in general, psychiatric, or forensic populations, is timely. A better understanding of suspicious jealousy could have a vital role in understanding any mechanisms involved that generate and maintain jealousy and are involved in distorted thinking, which in turn may offer insights that integrate the situational and dynamic factors found to influence jealousy. Moreover, by drawing an analogy between paranoid thinking and suspicious jealousy, while ensuring the careful consideration of any differences, research into less severe forms of pathological jealousy might be developed, which may give additional insight into clinical forms of the condition. Furthermore, a better understanding of jealousy's relationship to paranoia could help to better delineate jealousy's role in adverse outcomes, such as aggression.

This review examines the research on characteristics, features, mechanisms and processes related to suspiciousness in jealousy, using a framework derived from prominent research on paranoid ideation (reviewed above) to guide the analysis. The overarching review question was:

Is there evidence that irrational, suspicious jealousy and paranoia are different forms of the same syndrome or share a common latent process?

In order to address this, the sub-questions were:

1. What is the similarity between the phenomenology of paranoia and irrational, suspicious jealousy?
2. What are the shared cognitive, affective and behavioural outcomes and mental health correlates and what aetiological mechanisms are proposed to link these to jealousy?
3. What is the quality of research conducted that addresses the review's questions?

Method

A systematic review and an integrative approach was used to search and analyse data which meets the aim to evaluate the evidence for alternative theories, identify gaps in the literature, and create a basis for building further theory (Kastner, Antony, Soobiah, Straus, & Tricco, 2016; Kastner et al., 2012). It summarises a broad base of literature utilising diverse study designs and methods, and facilitates a more comprehensive understanding of a phenomenon (Whittemore & Knafl, 2005).

Search Strategy.

A systematic review following the PRISMA (2009) guidelines of the databases: CINARL, DARE, EMBASE, The Cochrane Database, The Campbell Collection, Medline, Patient-Reported Health Instruments (up to Feb 2016), ProQuest ASSIA, PsychInfo, PubMed, from the inception of the databases until 30 April 2019 and the first 100 retrieved studies on Google Scholar, between 1 January 1981 and 30 April 2019 (in order to limit the number of retrieved studies) was used to identify all published studies reporting a link between jealousy and cognition. Databases were selected for their quality and extensive coverage of the psychological and psychiatric literature. Search terms were identified in consultation with a subject librarian, and included: *irrational thinking ('cogniti*', or 'persec*', or 'psychosis' or 'psychotic' or 'suspicio*', 'irrational*' 'suspicious th*', 'paranoi*', 'delusi*', 'patholog*', 'trust') combined with jealousy ('jealous*', 'Othello', 'conjugal paranoia')*. Search terms included indexed items unique to each database (e.g., MeSh terms, PsycINFO index). Reference lists of the full-text articles (58) were also hand-searched to ensure comprehensive coverage of articles possibly not included in the database searches.

Inclusion and Exclusion Criteria

Articles were inspected for the inclusion or exclusion using predetermined criteria, which are reported in Appendix A.

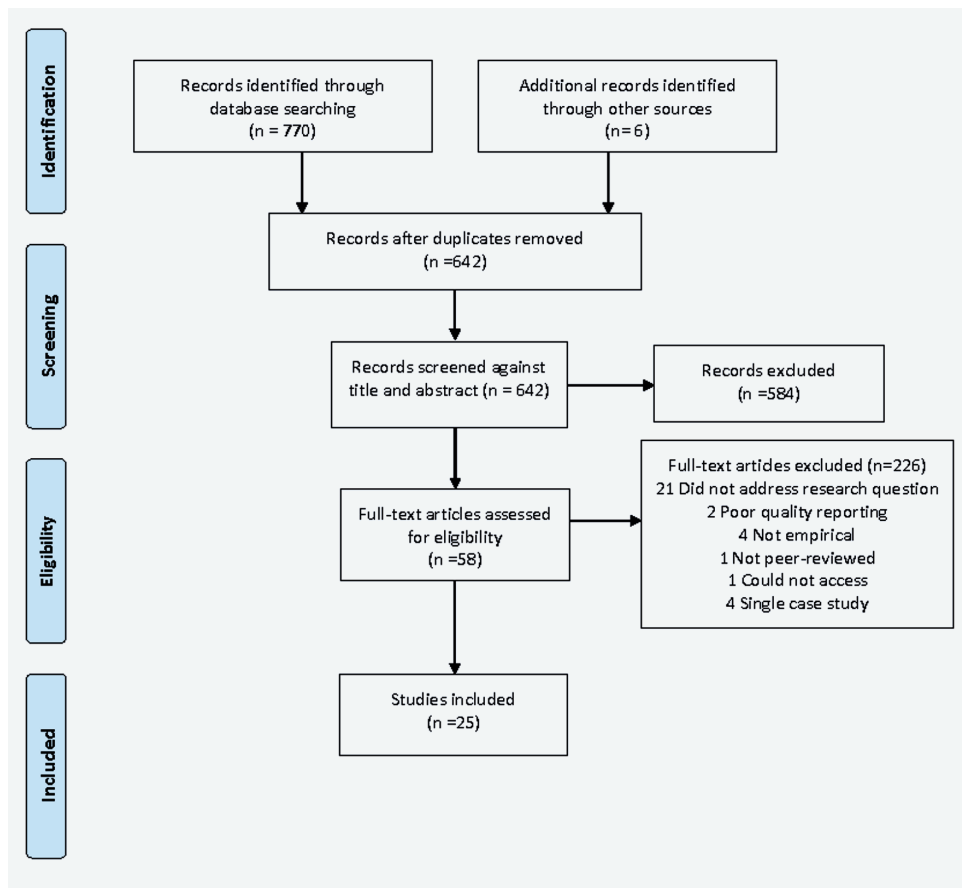


Figure 1. PRISMA diagram showing a systematic search for cognitive and paranoid processes in jealousy.

The author screened the 642 titles retrieved and the resulting 58 full-texts. Exclusions are summarised in Figure 1, with two articles excluded at abstract due to absent sample characteristic reporting. Screening resulted in 25 texts that were subject to a quality assessment based on the NICE criteria for quality assessment of correlational and quantitative studies, Appendix G (See Appendix B). Each study was separately graded for internal validity

and generalisability and received a grade of poor, adequate or good overall³. Detailed comments were recorded for transparency and reviewed with an academic supervisor. Due to the small number of papers that addressed the research question it was decided to retain all studies but to carefully report quality; all studies obtaining at least an adequate score for one summary criterion. This resulted in the 25 papers finally included. The author extracted the data (as detailed below), and the extraction grids were reviewed by both supervisors to ensure consistency. Data from the remaining studies were then extracted, and the final analysis double-checked by a supervisor.

Data management, analysis and synthesis. Papers were read, re-read and discussed and a matrix constructed (e.g., Greenhalgh, Kristjansson, & Robinson, 2007; Wong, Greenhalgh, & Pawson, 2010) within an Excel spreadsheet (Tables 1, 2, & 3⁴) to collate information for each research paper on:

- Sample size, population, study design, participant gender, and study aims.
- Research method, any intervention and control groups (to aid the specification of factors that discriminate between those who did or did not display irrational jealousy).
- Any aspect of the study's history and context the study's authors thought important.

Extracted sections were indexed and linked to an emerging analytic framework as each article was read, and re-read, data was extracted to answer the review questions (Tables 4–6).

³ The paper was given ++ if all or most of the checklist criteria were fulfilled, or where they were not fulfilled the conclusions are very unlikely to alter; + where some of the checklist criteria were fulfilled, and where not fulfilled, or not adequately described, the conclusions are unlikely to alter and; — few or no checklist criteria were fulfilled, and any conclusions are likely or very likely to alter.

⁴ The section summary Tables 3–6 only include studies which contain data relevant to that section.

Results

Characteristics of Studies

A total of twenty-five papers met the inclusion criteria (Figure 1). Selected studies employed various methods as follows: cross-sectional questionnaire studies (20) (including papers with more than one reported study); multi-patient record reviews and case histories (5); experimental studies (1); interview (2); neuroimaging (1) and clinical assessment (1). Studies spanned multiple populations, including general population samples: (14), student (9) and community (5); clinical (10); and forensic (2). The majority of samples included both male and female respondents (22), but three were male only (3). The number of papers retrieved that informed each research question was unequal: Question 1 (11), Question 2 (4), and Question 3 (18). The vast majority of research retrieved considered organic neurological degenerative conditions, such as Parkinsonism, traumatic brain injury or toxins, e.g., alcohol, that result in delusional jealousy, (for examples see Byrne & Yatham, 1989; Chae & Kang, 2006; Hodgson, Murray & Woods, 1992) with very little research on normal or sub-threshold clinical jealousy or jealousy related to mental health difficulties. Relevant papers were included to determine any commonality between brain structure and biochemical pathways to those of paranoia.

In order to capture and integrate the full spectrum of psychiatric pathology and intensity in jealousy, papers were included for general, clinical and forensic populations. Of the 25 papers included, the total combined number of participants from separate samples of different populations was 30,487: 6,264 general population, 23,923 clinical and 300 forensic participants.

Delusional jealousy spans multiple psychiatric classifications but is currently only diagnosed as a subtype of delusional disorder as described by DSM-IV (APA, 1994) and

ICD-10 (WHO, 1992); it is also referred to as jealousy related to alcoholism by ICD-10 (WHO, 1992). Previous ways in which it has been referred to in the psychological and psychiatric literature are: Othello syndrome, morbid jealousy, conjugal jealousy and pathological jealousy.

Conceptualisation and Measurement of Jealousy. Eight studies conceptualised jealousy as a delusional theme (Studies 4, 13, 15, 16, 17, 20, 21, & 22). The remaining studies used a number of different tools in order to measure jealousy. The measures comprised: DSM IV delusional jealousy criteria (Studies 16, 17, & 24); DSM III paranoid jealousy criteria (Study 16); diagnosis of delusional jealousy; or other psychiatric diagnosis using ICD 9 criteria and where jealousy was mentioned in the case notes (Study 22); Association for Methodology and Documentation in Psychiatry System, (ADMP; Guy & Ban, 1982) (Study 21); SAPS criteria for assessment of delusional jealousy (Andreasen, 1984) (Study. 17); Jaspersian measures (Study 15); psychiatric case notes where jealousy is mentioned, or where case notes included a clinical diagnosis of jealousy (undefined criteria) or where they met a set of criteria based on Shrestha et al., (1985) (Study 4); and the Sexual Jealousy Questionnaire (Study 13).

Most studies ($n = 17$) used questionnaire measures (Studies 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 14, 18,19, 23, 24, & 25). Each of these studies included varied conceptualisations of jealousy which included jealousy as a heterogenous construct (Studies 10, 11, 12, & 14), as a multidimensional threat response) with related emotional, cognitive and behavioural components (Studies 1, 10, 11, & 12), or as related to the anticipated loss of a sexual object (Studies 6, 7, & 17).

Studies apply different measurement instruments and techniques to the measurement of jealousy. One study used a six–item questionnaire devised for the study (Study 25). Other

scales used included the: Chronic Jealousy and Relationship Scales (White, 1981) (Study 14); Anticipated Sexual Jealousy Scale (Buunk, 1997) (Studies 5 & 23); Interpersonal Relationship Scale, (Hupka & Rusch, 1979, 1989) (Study 5), Multidimensional Jealousy Scale; (MJS; Pfeiffer & Wong, 1989) (Studies 18 & 19); and the Interpersonal Jealousy Scale (IJS; Mathes & Severa, 1981; Mathes, Philips, Skowran & Dick, 1982) (Studies 6 & 7).

Each of these scales differs in its conceptualisation of jealousy. The Chronic Jealousy and Relationship Scales, Interpersonal Relationship Scales and the Interpersonal Jealousy Scale conceptualise jealousy as a trait. The Interpersonal Relationship Scale and The Chronic Jealousy and Relationship Scales include items that measure additional relationship variables proposed to relate to jealousy. The IJS conceptualises jealousy as a singular construct, whereas the MJS suggests that jealousy is multidimensional.

An important part of how jealousy is conceptualised is likely to be the author's underlying assumptions regarding the causes of jealousy. These assumptions which might also be expected to shape how jealousy measurements were operationalised. Most studies did not give details about what the author's assume causes jealousy. However, two studies (Studies 10 & 12) measured jealousy using the Questionario de Gelosia (QUEGE; Marazitti, 2010b), and its predecessor the Questionnaire of Adjustment to Relationships (QAR, Marazitti, 2003) this approach assumes that jealousy is related to underlying psychopathy. Furthermore, Studies 3 and 11, which used the Communicative Responses to Threat Scale, Guerrero et al, 2011) (Study 2) viewed jealousy as a communicative response to threat.

Prevalence of Jealousy. Whilst most people report normal (reactive) jealousy at some point in their lives (Mullen & Martin, 1984), it is more difficult to determine the prevalence rate of irrational jealousy in the general population as there is no current research in this area. Two clinical studies (Studies 21 & 22) report prevalence rates in large cross-

diagnostic psychiatric samples, which suggest prevalence rates of delusional jealousy of between 0.5-1.1% of all clinical admissions. These are highest in those admitted with schizophrenia (11.1%), organic psychoses (7%) and paranoid disorder (6.9%)

Table 1. Characteristics of included studies

| Study # authors (year) | Aim | Method | Participant (gender, age in years) | Comparison group | Population | Measured variables | Main findings |
|-------------------------------|---|--|---|-------------------------|-------------------|---|---|
| 1. Buunk (1997) | Examine the relationship between multidimensional jealousy and personality esp. cognitive components. | Experimental lab study with control | 964 participants, (861 women, Dutch; Age range: 1576) | n/a | Community. | Reactive, preventative and anxious jealousy (Anticipated Sexual Jealousy Scale; Buunk, 1988 ; Other 2 constructed for the study), Dutch personality Questionnaire (Neuroticism, Social Anxiety, Egotism, Dominance, Self-Esteem); Attachment (Hazan & Shaver's vignettes); Birth order; Father's occupational level; Relational satisfaction; Interest in sex outside current relationship, (2 questions) | All three types of jealousy (reactive, possessive and anxious) are not related to egoism and dominance, but significantly correlated with neuroticism (.32***, .45***, .47***), social anxiety (.31***, .27***, .22***), rigidity (.22***, .25***, .24***), self-esteem (-.21***, -.28***, -.28***) and possessive and anxious jealousy with hostility (.23**, .28***). |
| 2. Carson & Cupach (2000) | Explore factors that may account for individual variations in responses to romantic jealousy. | Separate patient and spouse interviews | 210 heterosexual couples, (Age range: 1844, $M_{Age} = 22.09$; partners age range: 1852, $M_{Age} = 22.71$) | n/a | Student | Relationship specific linking, relationship specific rumination, trust, possessiveness, communicative responses to jealousy, surveillance/restriction (No standard scales/some were developed for other research, others specifically for this study) | Relationship-specific rumination was negatively associated with trust (-.676**), positively associated with possessiveness (.672**), surveillance/restriction (.466**), manipulation (.357**), relationship threat (.372**), rival contact (.141*), compensatory restoration (.318**), negative affect expression (.366**), signs of possession (.187**), derogation of competitors (.303**), distributive communication (.323**), violent communication (.181**), violence toward objects (.190**), active distancing (.307**), and avoidance/denial (.332**). |

| Study # authors (year) | Aim | Method | Participant (gender, age in years) | Comparison group | Population | Measured variables | Main findings |
|------------------------|---|---------------------------|--|--|---------------------------------|--|--|
| 3. Costa et al. (2015) | To identify the characteristics of romantic relationships, emotional functioning, personality aspects, and social adjustment in individuals with pathological jealousy. | Questionnaire | 32 patients with pathological jealousy (8 Men; Age range: 21-50; $M_{Age} = 39.7$) | 31 healthy controls (6: male; $M_{Age} = 32.6$) | Clinical, Community Comparison. | Questionnaire of Affective Relationships (QAR); Jealousy, Attachment Style AAQ; Hazan and Shaver, 1987, Love Style, Relationship Style (Dom/Sub/Helping), Aggression (Measured items are not measures of aggression the scale is designed for measuring sedation), Relationship Quality, Depression, Anxiety, Temperament, Character (They were not validated measures, but developed for this study), Impulsiveness, Social Adjustment. | A forward logistic regression model found jealousy intensity ($U=151^{***}$) and trait anxiety ($U=25^{***}$) best distinguished participants with Pathological jealousy from the healthy control group. |
| 4. Crowe et al. (1988) | Compare patients with delusional and non-delusional jealousy. | Review of patient records | 108 psychiatric patients admitted between 1920–1980; Jealous Group, $n=43$: (Females 28, $M_{Age} = 41.4$) | Non-jealous Group $n=55$: (Females 25, $M_{Age} = 39.9$) | Clinical | Demographics: Age at onset, age, occupational Status, Years Education, Marital Status, Sex. Clinical diagnosis comparison, (delusional theme and classification). Chart review by social worker, then psychiatrist. A total of 1,483 records with discharge diagnoses including the terms paranoid or paranoia were reviewed. | Compared with non-jealous patients, jealous ones were more likely to have had a single delusion and experienced a more benign course – indicated by a lower rate of hospitalization (<i>Jealous</i> $n=4$, <i>Non-Jealous</i> $n=21$) and outpatient treatment (<i>Jealous</i> $n=3$, <i>Non-Jealous</i> $n=21$ (Follow up $n=Jealous, n=37$, <i>Non-jealous</i> $n=51$)). The original delusion tended to remain. Illness did not develop into another form of delusional disorder or other psychiatric illness. |

| Study # authors (year) | Aim | Method | Participant (gender, age in years) | Comparison group | Population | Measured variables | Main findings |
|---------------------------------------|--|--------------------------------------|---|-----------------------------|-------------------|--|---|
| 5. DiBello et al. (2014) | To evaluate whether drinking to cope mediates associations between jealousy and drinking problems. | Questionnaire ; recall of experience | 657 (59.37% female) participants, Midwestern university, ($M_{Age} = 20.18$, $SD = 0.6$), 2-year follow-up study | n/a | Student | Jealousy: Interpersonal relationship scale (Hupka & Rusch, 1989); Drinking to cope: 5 item subscale of Drinking Motives Questionnaire Revised; Alcohol Consumption: Daily Drinking Questionnaire; Drinking Problems: Rutgers Alcohol Problem index Modified with two items | Drinking to cope mediated some aspects of jealousy and alcohol use problems. In particular, the more negative or maladaptive aspects of jealousy were related to drinking to cope and drinking problems (vindictiveness: $\beta = .218$, $t(637) = 4.57$, $p < .001$), distrust: $\beta = .218$, $t(637) = 2.65$, $p < .01$), whilst the more adaptive aspects were not, suggesting a more complex view of jealousy than previously understood. |
| 6. Dutton (1994) | Ascertain whether BPO relates systematically to concurrent aspects of wife assault such as use of violence, verbal abuse, anger, jealousy, trauma symptoms, and substance abuse. | Questionnaire | 120 self and court referred assaultive males (Age range: 17–65, $M_{Age} = 35$) | n/a | Forensic | Assaultiveness: CTS; BPO; Self report instrument for BPO, subscales: identity diffusion, primitive defences, reality testing MMCI C Subscales (Borderline); Anger: Multidimensional Anger Inventory, subscales: frequency, duration, magnitude, mode of expression, hostile outlook, and range of anger-eliciting situations; Jealousy: Interpersonal Jealousy Scale (Mathes & Severa, 1992); Alcohol Use: Michigan Alcohol Screening Test; Drug Use: Drug Abuse Screening Test; Chronic Trauma Symptoms: Trauma Symptoms Checklist (TSC-33), subscales: dissociation, anxiety, depression, post-sexual abuse trauma | BPO has transient psychotic episodes. Higher BPO scorers have significantly higher levels of jealousy ($t = 3.03$, $df = 118$, $p = .004$). In a canonical correlation analysis, three variables (trauma symptoms, anger, and jealousy) correctly classified 88% of high and low scorers. |

| Study # authors (year) | Aim | Method | Participant (gender, age in years) | Comparison group | Population | Measured variables | Main findings |
|------------------------------|---|---------------|---|---|------------|--|--|
| | | | | | | hypothesized, and sleep disturbance. | |
| 7. Dutton et al. (1996) | Examine associations between personality dimensions and stalking or intrusiveness in male participants. | Questionnaire | 160 incarcerated men and 76 partners (MAge = 35yrs, Age range: 17–65) | Matched control from the general population (MAge = 35, Age range: 19–45) | Forensic | Age, Income Group, Years at school, Attachment: Relationship Scales Questionnaire (Griffin & Bartholomew), emotional expression (anger: Multidimensional Anger Inventory (MAI, Siegel, 1986); Jealousy: Interpersonal Jealousy Scale (Mathes and Severa, 1981; Mathes et al., 1982)), Current trauma symptoms: Trauma Symptom Checklist (TSC-33, Briere and Runtz, 1989), Borderline Personality Organization: Self-Report Instrument for Borderline Personality Organization (Oldham et al., 1985); (MCMI-II) (Millon, 1992); Partner Abuse Tolman's (1989) Psychological Maltreatment of Women Inventory (PMWI), CTS (Straus et al., 1979); Severity of Violence Against Women Scales (SVAWS; Marshall, 1992; Intrusiveness: Intrusiveness Scale is an ordinal scale of 15 items derived from the Canadian | Jealousy was related to BPD ($r=0.41^{***}$), and PTSD($r=0.42^{***}$). It is related to reality testing ($r=0.30^{***}$) and identity ($r=.43^{***}$) subscales of BPO, Aggression (CTS total abuse score $r=0.19^*$; SVAWS total $r=0.29^{**}$), Anxiety ($r=0.31^{**}$), Trauma Symptoms (see above), Depression ($r=0.36^{***}$), Self-Defeating ($r=0.32^{***}$) (highest subscale correlation), avoidant($r=0.30^{***}$) and passive aggressive ($r=0.29^{**}$) subscales of the MCMI, and RSQ fearful attachment ($r=0.34^{***}$). Trauma Symptoms was the highest correlation. Extremely strong correlations between jealousy scores and wives' reports of intrusiveness ($r=0.43^{**}$), emotional abuse($r=0.80^{***}$), control/domination ($r=0.57^{***}$). Jealousy, BPO, fearful attachment, and trauma symptoms explained 32% of the variance for control/domination and 62% of the variance for emotional abuse accounted for 65% of Intrusiveness. Results suggest individuals with high rejection sensitivity experience higher levels of jealousy, and subsequently greater propensity for aggression, than individuals with low rejection sensitivity. |

| Study # authors (year) | Aim | Method | Participant (gender, age in years) | Comparison group | Population | Measured variables | Main findings |
|------------------------|--|---------------|--|------------------|------------|--|---|
| | | | | | | Criminal Code; Social Desirability: The Marlowe-Crowne Social Desirability Scale (Crowne and Marlowe, 1960) | |
| 8. Hesse et al. (2016) | Explore the relationship between communication patterns, alexithymia, and expressed jealousy. | Questionnaire | 281 Adults, U.S. university students, (185 female, $M_{Age} = 19.16$ yrs.) | n/a | Community | Revised Family Communication Pattern Instrument (RFCP; Richie & Fitzpatrick, 1990); Revised Communicative Responses to Jealousy scale (CRJ; Guerrero et al., 2011); Toronto Alexithymia Scale (TAS-20; Bagby, Parker, & Taylor, 1994). Age, gender, duration of relationship, ethnicity. | Being female ($t(272) = -2.17$) and relationship length ($r(275) = .19$) is correlated with negative communication. Being male is associated with rival contact ($t(272) = 2.51^{**}$). Positive family communication style is associated with positive forms of jealousy expression ($\beta = .20^*$). Negative family communication style is not associated with negative jealousy expression styles. Alexithymia moderates jealousy expression. It is positively associated with negative expressions of jealousy and negatively associated with positive forms of jealousy expression. |
| 9. Lima et al. (2017) | Replicate the factor structure of the QUEGE in a Brazilian sample and to explore the relationship of jealousy sub-type to mental health pathology. | Questionnaire | 1970 Brazilian Adults (71% women, $M_{Age} = 28.9$, $SD = 8.8$) | n/a | Community | Questionario della gelosia QUEGE (Marazziti et al., 2010a) subscales described in the original, Temperament Evaluation Memphis, Pisa and San Diego (TEMPS; Woodruff et al., 2011); Symptom Revised Checklist (SCL-90R; Carissimi, 2011; Derogatis & Melisaratos, 1983). Subscales included somatisation, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. | The results can be reinterpreted as: Model fit statistics ($RMSEA = 0.062$, $AIC = 104,351.6$) indicate that the adjusted model is only adequate (Holbert & Stephenson, 2008). Factor structure (item loading) not same as previous studies indicating sub-scales (factors) are unstable. Obsessional and Paranoid subscales are stable- Paranoia only correlates with anticipated pathology i.e., <i>psychosis</i> and <i>paranoia</i> subscales of SCL-90R, obsessional jealousy does not correlate with any pathology, as measured by SCL-90R, (indicating normal jealousy). The further three subscales appear to represent only two factors: <i>negative anxious affect</i> , and <i>interpersonal sensitivity</i> (see Marazziti et al., |

| Study # authors (year) | Aim | Method | Participant (gender, age in years) | Comparison group | Population | Measured variables | Main findings |
|------------------------------|---|---------------|---|---|--|---|--|
| | | | | | | All adapted for Brazilian samples. | 2010a) the items within the <i>interpersonal sensitivity</i> factor may be better represented as partner controlling behaviour than interpersonal sensitivity. |
| 10. Marazziti et al. (2010b) | Explore possible relationship between some qualitative characteristics of jealousy in the general population. | Questionnaire | 100 participants, Italian police department and friends/partners of psychiatric patients (55 men; $M_{Age}=34.12$, $SD=7.99$) | n/a | Community. | Experiences in Close Relationships questionnaire (ECR); "Questionario della Gelosia" (QUEGE), subtype/dimension: obsessive jealousy/obsessionality, depressive jealousy/self-esteem, and separation anxiety-related jealousy/fear of loss, paranoid jealousy/suspiciousness, and sensitivity-related jealousy/interpersonal sensitivity. Gender, age, marital status, work status and duration of the relationship. | The results showed that the ECR <i>anxiety</i> scale was significantly and positively related to all QUEGE dimensions (<i>self-esteem</i> , <i>suspiciousness</i> , <i>obsessionality</i> , <i>interpersonal sensitivity</i> , <i>fear of loss</i> : respectively $r=.437^{***}$, $r=.309^{**}$, $r=.583^{***}$, $r=.633^{***}$, $r=.577^{***}$) whilst the ECR <i>avoidance</i> scale was related only to the <i>self-esteem</i> , <i>fear of loss</i> and <i>suspiciousness</i> dimensions (respectively $r=.302^{**}$, $r=.311^{**}$, $r=.229^*$). |
| 11. Marazziti et al. (2003a) | Definition of the boundary between obsessional and normal jealousy. | Questionnaire | OCD patients (10 women, $M_{Age}=29$, $SD=6.5$) | Students, $n=245$ Female 159; $M_{Age}=26\pm 6.5$) | Clinical outpatient, Student comparison. | Y-BOCS (Yale-Boston Obsessive Compulsive Scale and QAR (Questionnaire of Adjustment to Relationships). Age, gender, and screened for physical health and other pathology. | Patients with OCD had higher total jealousy scores than healthy subjects (respectively Mean = 64.9, $SD=16.2$; Mean 49.9, $SD=14$); an intermediate group of subjects, corresponding to 10% of the total, were concerned by partner jealous thoughts, but at a lower degree than patients, and "healthy jealous subjects" with no other psychopathological trait. Significant differences were observed for single items – Ability to put the concerns out of the mind, the impairment of relationship, the limitation of a partner's freedom and the checking up on a partner's behaviours. This could not be |

| Study # authors (year) | Aim | Method | Participant (gender, age in years) | Comparison group | Population | Measured variables | Main findings |
|---------------------------------|--|---------------|--|-----------------------------------|-----------------------|---|--|
| | | | | | | | attributed to OCD, family history of OCD, or sub-clinical OCD because they had already been screened for this. Ability to put concerns out of mind, relationship impairment, checking on partner and controlling behaviours distinguished between healthy jealous, healthy non-jealous and OCD clinical patients on an increasing continuum. Frequency of the concern, suspiciousness, interference with daily activities, strategies to avoid concerns and checking for traces of sexual intercourse distinguished jealous-healthy from OCD (statistics not reported). |
| 12. Marazziti et al. (2010a) | Distinguish between four possible subtypes of normal jealousy (depressive, anxious, obsessive, and paranoid), by developing a new questionnaire, Questionario della gelosia (QUEGE). | Questionnaire | 500 Adult subjects (186 male) recruited from university students and their acquaintances living in Pisa, Italy ($M_{Age}=28.6$, $SD=9$) | Healthy Non-clinical participants | Student and Community | The participants were screened for Axis I and II disorders by clinical interview with the lead author (a senior psychiatrist). This is a development of the QUEGE instrument. | Factor analysis identified five rather than four clear-cut factors: self-esteem, paranoia, interpersonal sensitivity, fear of being abandoned, and obsessiveness (respectively 11.9%, 11.4%, 11.1%, 9.6%, 8.8% of the variance). Women showed statistically significant lower levels of self-esteem ($p=.01$) and higher levels of obsessiveness than men ($p=.04$). Younger age (<25 years) was associated with lower self-esteem and higher levels of paranoia and obsessiveness (significance unreported); being single was associated with lower self-esteem ($p=.036$) and higher levels of obsessiveness ($p<.001$). |

| Study # authors (year) | Aim | Method | Participant (gender, age in years) | Comparison group | Population | Measured variables | Main findings |
|----------------------------|--|---------------|---|------------------|------------|---|---|
| 13. Michael et al. (1995) | Examine nature and prevalence of morbid jealousy in male patients with alcohol dependence and its association with clinical and demographic variables. | Questionnaire | 207 Alcoholic patients. (All Male; $M_{Age}=40$, $SD=8.4$) | | Clinical | Clinical interview x 2, Sexual Jealousy Questionnaire – relevant demographic data, drinking history, psychiatric history, history of violence, pre-morbid personality mental state examination and a detailed assessment of jealousy. | Thirty-four per cent (71 out of 207) suffered from morbid jealousy. Morbid jealousy had different manifestations. Some patients expressed it only when intoxicated (28%), others even when sober (72%) and in some the jealousy took the form of a delusional disorder (22%). Delusional disorder would not have categorised the majority of the patients suffering delusional jealousy and the categorisation is therefore too restrictive. |
| 14. Mullen & Martin (1994) | Describe behaviours, attitudes and strategies associated with jealousy and the demographic and mental health correlates of those who expressed high levels of jealousy concerns. | Questionnaire | 351 Community participants (no information about gender or age) | | Community. | Demographic information, including marital, educational and socio-economic status, birth order and parents' educational and socio-economic status, Rosenberg Self-esteem Scale (Rosenberg, 1965; Ingham et al, 1986) (c) General Health Questionnaire (GHQ28; Goldberg & Williams, 1988) which had been standardised and validated in the local community (Romans-Clarkson et al, 1989), the WHO alcohol consumption scale (Saunders et al., 1987) Spielberger Anger Expression Scale (Spielberger et al, 1988), which measures both overt anger and suppressed anger, social support data in which subjects were asked about their degrees of satisfaction with their current relationship and overall level | Searching the partner's belongings (reported by 7% females, 1% males**) or inspecting their clothes for signs of sexual activity (1 male, 6 women) correlated with unusually intense jealousy (and reported exclusively by the more jealous group). Men tended to cope with jealousy by using denial and avoidance (21% v 13%*). Women were more likely to express their distress (32% v 11%**) and to try to make themselves more attractive to their erring partner (20.2% v 9.8%**). Greater jealousy concerns were expressed by heavy drinkers (24.2% v 8.2%**) and those reporting more psychiatric symptoms (ORR 2.78 [1.6–4.9]). A clear correlation emerged between lowered self-esteem and increased jealousy, which was particularly marked in women (ORR male 2.32 [1.03–5.22] ORR female 5.69 [2.33–13.9]). |

| Study # authors (year) | Aim | Method | Participant (gender, age in years) | Comparison group | Population | Measured variables | Main findings |
|---|--|--|--|-------------------------------------|------------------------------------|---|---|
| | | | | | | of social support (g) a 50-item jealousy scale which was developed from White's (1981a) Chronic Jealousy and Relationship Scales which explored the subjects' experience of amorous jealousy. | |
| 15. Musalek et al. (1989) | Examine the relationship between certain frequently occurring delusional themes (persecution, jealousy, love or illness) and the age of first manifestation. | Questionnaire | 865 Clinical patients with delusional syndromes, (Age and gender reported in analysis) | | Clinical | Routine documentation system, those presenting with hypochondriacal delusions, persecutory delusions, love or jealousy delusions. | The distribution of delusional theme differed between genders (62.5% of women presented with a persecutory theme, jealousy was more likely in men (69.2%) than women (30.8%). The difference between persecutory and jealous delusions was found to be significant ($\chi^2 = 35.68^{**}$). Persecutory delusions had an earlier onset in males (73% after age 30 yrs.) when compared to jealous delusions (2/3 of cases after age 40 yrs. ***). No significant differences could be found in age of onset between persecutory and jealous delusional themes. |
| 16. Ortigue, & Bianchi-Demicheli (2011) | Identify all individuals with a stroke, who had been reported to have associated jealousy; to determine what part of the brain is mostly involved in jealousy; and to try to determine what characteristics of these individuals | Questionnaire ; Neuroimaging (fMRI, SPECT) | 20 Stroke patients with jealousy (6 Female), Age range:20-77 | 22 non clinical matches (11 Female) | Clinical, Non-clinical comparison. | DSM-IV criteria. | Right hemispheric stroke was the most frequently reported neurological disorder in these patients (45%), although there was a wide range of more diffuse neurological disorders that may be reported to be associated with different types of jealousy. This is in line with recent neuroimaging data on false beliefs, moral judgments, and intention [mis] understanding. |

| Study # authors (year) | Aim | Method | Participant (gender, age in years) | Comparison group | Population | Measured variables | Main findings |
|------------------------------|---|------------------------------|---|---------------------|---|---|--|
| | may be categorized as a pattern. | | | | | | |
| 17. Paolini et al. (2016) | Investigate the prevalence of delusions and different delusional themes, to explore the relationship between theme, hallucinations, and negative symptoms. Between theme and childhood adversity type. Between theme and cannabis and other drug use. | Case review and test battery | 245 clinical patients with first episode psychosis (n=182 male, U.S., Age range, 18–39) | n/a | Clinical, first episode psychosis. Selected from first 247 in database presenting with first episode psychosis. | Scale for the Assessment of Positive Symptoms (SAPS; Andreasen, 1984), Scale for the Assessment of Negative Symptoms (SANS; Andreasen, 1983), Positive and Negative Syndrome Scale (PANSS), Structured Clinical Interview for DSM-IV Axis I Disorders (SCID; First et al., 1998); Childhood Trauma Questionnaire-Short Form (CTQ-SF; Bernstein et al., 2003), Trauma Experiences Checklist (TEC; Cristofaro et al., 2013), Parental Nurturance (Barnes & Windle, 1987), Parental Harsh Discipline (Ge et al., 1994, Mrug et al., 2008), Friends' Delinquent Behaviour (Mrug et al., 2012), School Connectedness Scale | The most prevalent type of delusion is paranoia (11.6%), associated with older age and later onset (Median Age. 21.6 yrs. $SD=5.2$)/ 20.4 $SD= 4.0^{**}$). Delusions of influence are correlated with hallucinations and severity of negative symptoms (respectively $\rho=0.485^{**}$, $\rho=0.214^{**}$). General relationship between all types of delusional theme (Delusions of: Influence, Grandiose/Religious, Paranoid, Negative Affect, Somatic) and childhood adversity (respectively 0.234 ^{**} , 0.196 [*] , 0.200 ^{**} , 0.284 ^{**} , 0.164 [*]). Environmental violence and Interpersonal abuse correlate significantly with all delusional themes. Delusions of influence ($F_{2,228}=8.505^{***}$) and delusions of negative affect (inc. jealousy) ($F_{2,228}=3.333^{*}$) higher among users of cannabis and stimulants. Indicates jealousy to be a type separate to persecutory, delusions of reference, etc and related to other types of negative affect delusion (i.e., sin or guilt). However, delusions of jealousy are relatively |

| Study # authors (year) | Aim | Method | Participant (gender, age in years) | Comparison group | Population | Measured variables | Main findings |
|-----------------------------------|--|---------------------------------------|--|---------------------|---------------------|--|--|
| | | | | | | (Sieving et al., 2001). Age, gender, ethnicity, yrs. of school, Parental Status, Relationship Status, substance abuse, employment status, brought up by, religious affiliation. | rare as primary diagnostic categorisation, and there were only two in the sample. Co-morbidity and co-occurrence of other delusions was not reported and would have helped to answer the current studies questions. |
| 18. Rodriguez et al. (2015) | Determine if distrust in one's partner is associated with higher levels of both cognitive and behavioural jealousy and if this association is particularly strong for individuals who are higher in anxious attachment. Also, if distrust is associated with higher levels of physical and psychological partner abuse perpetration particularly among anxiously attached individuals. | Questionnaire and clinical assessment | 261 (85% female) university employees and students; 18 to 52 years ($M_{Age} = 22.51$, $SD = 4.79$) | | Student, Community. | Trust Scale (Rempel & Holmes, 1986); Romantic jealousy: MJS (Pfeiffer & Wong, 1989); Attachment Anxiety: Experiences in Close Relationship Scale (Wei, Russell, Mallinckrodt, & Vogel, 2007); IPV Revised Conflict Tactics Scale (CTS2R; Straus & Douglas, 2004). Non-Physical Abuse of Partner Scale (Garner & Hudson, 1992). | Attachment anxiety moderated the association between trust and jealousy, anxious individuals experienced much higher levels of cognitive ($b = -.095$, $t(254) = -2.36^*$) and behavioural ($b = -.070$, $t(254) = -2.04^*$) jealousy when reporting lower levels of trust. Attachment anxiety moderated the association between trust and non-physical violence ($b = -.071$, $t(254) = -2.05^*$). Anxiously attached individuals are more likely to become jealous, snoop through a partner's belongings, and become psychologically abusive. |

| Study # authors (year) | Aim | Method | Participant (gender, age in years) | Comparison group | Population | Measured variables | Main findings |
|-----------------------------|--|--|---|------------------|--|--|---|
| 19. Rydell & Bringle (2004) | Determine if suspicious jealousy is positively associated with both anxious and avoidant attachment. | Questionnaire | Study 1: 292 (213 Female; $M_{Age} = 21.9$ yrs); Study 2: 351 (236 Female; $M_{Age} = 18.72$) | | Student | Study 1: Multidimensional Jealousy, Relationship dependency, insecurity, Adult Attachment Style (Experiences in Close Relationships Scale). Study 2: Multidimensional Jealousy, Chronic Jealousy (White, 1981), Relationship dependency and insecurity, Relationship trust. Global Self-Esteem. | Reactive jealousy was associated with greater dependency (.40, $p < .001$), chronic jealousy (.15, $p < .05$), trust (.19, $p < .05$), being younger (-.17, $p < .001$), being female (.13, $p < .05$). Suspicious jealousy was associated with (43% variance): insecurity (Study 1 .50, $p < .001$; Study 2 .21, $p < .001$), anxious-attachment (Study 1 .16, $p < .01$), chronic jealousy (Study 2 .42, $p < .001$), trust (-.25, $p < .001$), self-esteem (Study 2 -.10, $p < .01$). Suspicious jealousy is unrelated to dependency, avoidant attachment, gender or age. (Results for study 2 only include figures for unique variance) |
| 20. Silva et al. (1998) | Report important psychiatric and psychosocial characteristics in a sample of 20 cases of delusional jealousy; and to explore the degree of dangerousness posed by these subjects; and to initiate the development of a bio-psychosocial framework for understanding dangerous delusional jealousy. | Review of case history/medical records | 20 forensic inmates (19 men; Age range = 25–77) | | Clinical & Forensic Psychiatric Patients | Demographic (marital status, age, ethnicity, age at onset of psychosis, age at onset of delusional jealousy). Clinical and Forensic data from case notes, DSM-IV criteria diagnosis. Brain scan – fMRI and PT data. | Delusional jealousy usually co-exists with other delusional forms and is related to aggression against partners (60% as opposed to 10% in other delusional types). Delusional jealousy may be one component of a more complex delusional system. In 95% of cases a paranoid component was found closely associated with delusional jealousy. |

| Study # authors (year) | Aim | Method | Participant (gender, age in years) | Comparison group | Population | Measured variables | Main findings |
|-------------------------------|---|--|--|-------------------------|-------------------|---|--|
| 21. Soyka & Schmidt (2011) | Replicate in a larger patient sample previous findings concerning the prevalence of delusional jealousy in psychiatric disorders. | Review of medical records | 14,309 psychiatric in-patients (49.5% men, $M_{Age}=41.8$) | | Clinical | AMDP assessment system – semi-structured rating scale each symptom. Delusional jealousy is a single item: 'conviction of being deceived or betrayed by a loved one. An unfounded conviction'. | Jealousy prevalence was 1.1%. Delusions of jealousy were most frequent in organic psychoses (7.0%), paranoid disorders (6.7%), alcohol psychosis (5.6%) and schizophrenia (2.5%), whereas in affective disorder delusions of jealousy could be found in only 0.1 %. |
| 22. Soyka et al. (1991) | Examine the prevalence of delusional jealousy in different psychiatric disorders and the possible influence of age and sex on the aetiology of delusional jealousy. | Review of medical records for prevalence | 8134 Adult Psychiatric patients (93 identified with delusional jealousy; 55.6% women; $M_{Age}=47.1$) | | Clinical | Retrospective clinical notes/charts and case histories: clinical diagnosis, age, gender, number of years with psychosis etc., and diagnosis. Patients with schizophrenia, delusional disorder and alcoholism are most likely to suffer delusional jealousy. | Prevalence of delusional jealousy in 8134 psychiatric in-patients was 1.1%. Delusions of jealousy were most frequent in organic psychoses (7.0%), paranoid disorders (6.7%), alcohol psychosis (5.6%) and schizophrenia (2.5%), whereas in affective disorder delusions of jealousy could be found in only 0.1%. Schizophrenia and affective disorder were the most common diagnoses, most patients with delusions of jealousy were schizophrenics. In schizophrenia, women were more likely to suffer from delusional jealousy (72.4%, compared to 52.2%), and also as a result of alcohol psychosis (3.4% compared to 2.3%). |

| Study # authors (year) | Aim | Method | Participant (gender, age in years) | Comparison group | Population | Measured variables | Main findings |
|------------------------------|---|---------------|--|---------------------|--|--|---|
| 23. Swami et al. (2012) | Determine if the love-is-blind bias would predict the experience of both possessive and anxious jealousy once the effects of love-styles and relationship satisfaction have been statistically controlled for. Determine no association between the love-is-blind bias and reactive jealousy. | Questionnaire | 217 Heterosexual Participants; (117 women. $M_{Age} = 26.94$, $SD = 10.01$) | | Community | Demographics: age, sex, ethnicity, marital status, sexual orientation, length of relationship in months. Ratings of partner and self physical attractiveness: Estimating physical attractiveness scale (Swami et al., 2007); Jealousy experience: Revised anticipated Jealousy scale (1997); Love-styles: Revised Love-Style Perception Survey (Grote & Frieze, 1994); Relationship Satisfaction: 9 item measure created for the study. | The love-is-blind bias positively predicted the experience of anxious jealousy ($B = .49$, $SE = .15$ $\beta = .32$, $t=3.72$, $p<.001$). Furthermore, the love-is-blind bias was significantly and positively correlated with possessive jealousy but did not emerge as a significant predictor once the effects of love-styles had been taken into account ($B = .01$, $SE = .01$ $\beta = .05$, $t=0.69$, $p=.246$). The love-is-blind bias was not significantly correlated with reactive jealousy. |
| 24. TARRIER et al. (1989) | To determine if irrational jealous cognitions vary with subjective feelings of insecurity and low self-confidence and to examine if there were any other differences in personality dimensions of the EPQ-R | Questionnaire | N=170, 164 Female, final usable 159, $M_{Age} = 27$) | | Community, readers of a women's magazine & matched sample | EPQ-R (Eysenck, Eysenck and Barrett, 1985) and morbid jealousy. Demographics: gender, age. | Females with morbid jealousy are significantly more introverted, neurotic and psychotic ($F_{1,316} = 7.43$, $p<.01$; $F_{1,316} = 162.3$, $p<.01$; $F_{1,413} = 10.58$, $p<.002$) (as a personality trait rather than psychiatric diagnosis) than a matched normal population. |

| Study # authors (year) | Aim | Method | Participant (gender, age in years) | Comparison group | Population | Measured variables | Main findings |
|------------------------------|--|---------------|--|---------------------|-------------------------|--|--|
| 25. White (1981) | To test a causal model of jealousy. | Questionnaire | 150 Couples, ($M_{Age\ male} = 22.3$, Age range = 18 to 47), ($M_{Age\ female} = 21.1$, Age range = 16.5 to 40 years) | | Community & students | Jealousy, Comparison level, Self Esteem, Relationship Questionnaire created for this study. Relative attractiveness – 2 items, relative availability of opposite sex friends – 1 item; belief in partners attractive to another – 1 item; relative involvement – 1 item; Partners dissatisfaction with relationship – 2 items. Self Esteem: Rosenberg's 10-item scale. Perceived inadequacy: inadequacy scales – 7 items; Notice – 4 items; Worry – 2 9-point items; Jealousy 6 item self-report; Social Desirability: Crowne- Marlowe Social Desirability scale, 1964). | Greater relative involvement in the relationship and perceived inadequacy as a partner independently directly cause jealousy. These two primary appraisal variables also indirectly affect jealousy through the operation of two global secondary appraisal variables: noticing and worrying . Threat based on comparison and threat based on partner's evaluation of oneself are distinct and both types of threat may be either acute or chronic (Model fit for males – $\chi^2(66)=51.70$; and females $\chi^2(66) = 6.7$) The model accounts for 48.2% variance in Jealousy. |

Note. Standard statistical notation is used, in addition, *MAge* refers to the Mean Age of respondents, Statistical significance is abbreviated in the text to refer to $p=0.5^*$, $p=0.01^{**}$, and $p<0.001^{***}$. Additional abbreviations used in the text are as follows: *AMDP* assessment refers to the *Manual for the Assessment and Documentation of Psychopathology*, (Guy & Ban, 1982); *BPO* refers to Borderline personality organisation; *BPD* refers to Borderline personality disorder; *CTS* refers to the *Conflict Tactics Scale Revised* (Straus, Hamby, Boney-McCoy, & Sugarman, 1996); *DSM IV* refers to the *Diagnostic and statistical manual of mental disorders* (American Psychiatric Association, 1994); *EPQR* refers to the *Eysenck Personality Questionnaire Revised* (Eysenck & Eysenck (1993); *MMCI* refers to the Multimodal Coping Inventory (Craig, 2005). Other abbreviations in the text refer to: WHO this is the World Health Organisation; fMRI that is frequency magnetic resonance imaging; PT which is Positron Tomography, and SPECT. single photon emission computed tomography.

The Quality of Included Studies.

In addition to selecting only peer-reviewed papers, a quality assessment was conducted using the NICE criteria (2012; see Methods section and Appendix B). Eight studies had both good internal and external validity (Studies 1, 5, 14, 15, 16, 17, 21 & 22). Ten studies were of adequate quality, with either good or adequate internal or external validity (Studies 2, 4, 6, 7, 8, 11, 13, 19, 20 & 25) and seven had major methodological weaknesses (but were included as they directly addressed the research questions). Seven, on closer inspection of methodology, (Studies 3, 9, 10, 12, 18, 23 & 24) had elevated potential for contamination, lack of control for confounding variables, biased sampling, or the use of inappropriate or low-quality measures. The quality assessment for the included papers is summarised in Table 2.

Cross-sectional designs were the most common (80 % of studies). They were included despite limitations in control for extraneous variables and their ability to infer causation. Six cross-sectional studies (Studies 3, 4, 7, 11, 12 & 16) used matched controls, and therefore have greater control for confounding variables. Four studies used multiple methods (Studies 5, 16, 17 & 18), but the predominant method was again correlational, which means causal direction cannot be inferred. However, several studies used analyses of detailed case-notes extending over a patient's lifetime, which can give some indication of temporal precedence (4, 20, 21 & 22). One study (Study 1) using an experimental design, may also give some indication of causality. There are no reported longitudinal studies.

Four studies (Studies 1, 9, 21 & 22) had large sample numbers (n=964, n=1,970, n=14,309, n=8,134 respectively), contributing to higher statistical power. The majority of studies had appropriate and well-documented sampling populations and size and

were therefore likely to find any existing effect. The sampling methods used for many studies may have introduced error or bias due to the use of convenience samples or an inadequate sample for the analysis (Cochran, 1977). Furthermore, participants in clinical studies were often those who were already help-seeking, and therefore those who are more reluctant to seek help but important to include, may have been excluded. Most studies had well-reported, reasonable or low attrition rates.

Table 2. Quality assessment of the included studies

| Study ID | Study Design | Section 1: Population | | Section 2: Method of group selection | | | Section 3: Outcomes | | | Section 4: Analyses | | | Section 5: Summary | | | Overall quality grade | Comments | | | | |
|---------------------------|---------------------------|-----------------------|-----------------------------|--------------------------------------|------------------------------|-----------------------|-----------------------|---------------------------------|--|-----------------------|---------------------------|----------------------------|-------------------------------|----------------------|--------------------------------|-----------------------|----------|-------------------------|---------------|--------------------|----------------------------|
| | | 1.1 Source well desc. | 1.2 Eligible pop well desc. | 1.3 Selected rep eligible | 2.1 How selection bias minim | 2.2 Theoretical basis | 2.3 Contamination low | 2.4 Confounding id & controlled | 3.1 Outcome measures & procedures reliable | 3.2 Measures complete | 3.3 Imp outcomes assessed | 3.4 Follow-up time similar | 3.5 Follow-up time meaningful | 4.1 Sufficient power | 4.2 Multiple explan. variables | | | 4.3 Methods appropriate | 4.4 Precision | 5.1 Internal valid | 5.2 Generalisable |
| 1. Buunk (1997) | Experimental Lab Study | ++ | ++ | ++ | + | ++ | ++ | + | NR | + | NA | NA | ++ | ++ | ++ | + | ++ | ++ | ++ | Good | |
| 2. Carson & Cupach (2000) | Interviews | ++ | + | - | NR | ++ | NA | - | + | NR | ++ | NA | NA | ++ | + | ++ | + | + | + | Fair | |
| 3. Costa et al. (2015) | Questionnaires | ++ | + | + | NR | + | - | + | - | NR | + | NA | NA | - | - | - | NR | + | - | Poor | |
| 4. Crowe et al. (1988) | Review of medical records | ++ | ++ | ++ | + | ++ | + | + | ++ | ++ | - | ++ | ++ | + | ++ | ++ | ++ | ++ | + | Fair | Clinical delusional cases. |

| Study ID | Study Design | Section 1: Population | | | Section 2: Method of group selection | | | | Section 3: Outcomes | | | | Section 4: Analyses | | | | Section 5: Summary | | | Overall quality grade | Comments |
|--------------------------|-------------------------------------|-----------------------|-----------------------------|---------------------------|--------------------------------------|-----------------------|-----------------------|---------------------------------|--|-----------------------|---------------------------|----------------------------|-------------------------------|----------------------|--------------------------------|-------------------------|--------------------|--------------------|-------------------|-----------------------|---------------------------------|
| | | 1.1 Source well desc. | 1.2 Eligible pop well desc. | 1.3 Selected rep eligible | 2.1 How selection bias minim | 2.2 Theoretical basis | 2.3 Contamination low | 2.4 Confounding id & controlled | 3.1 Outcome measures & procedures reliable | 3.2 Measures complete | 3.3 Imp outcomes assessed | 3.4 Follow-up time similar | 3.5 Follow-up time meaningful | 4.1 Sufficient power | 4.2 Multiple explan. variables | 4.3 Methods appropriate | 4.4 Precision | 5.1 Internal valid | 5.2 Generalisable | | |
| 5. DiBello et al. (2014) | Questionnaire; Recall of experience | ++ | ++ | + | ++ | ++ | NR | ++ | ++ | NR | ++ | ++ | ++ | ++ | ++ | ++ | + | ++ | ++ | Good | |
| 6. Dutton (1994) | Questionnaire | ++ | - | + | - | ++ | ++ | - | + | + | NR | NA | NA | + | ++ | + | + | + | + | Fair | |
| 7. Dutton et al. (1996) | Questionnaire | ++ | - | + | - | ++ | + | + | + | NR | ++ | ++ | ++ | + | ++ | + | - | + | + | Fair | |
| 8. Hesse et al. (2016) | Questionnaire | ++ | + | + | NR | ++ | NA | - | - | - | ++ | NA | NA | ++ | NA | ++ | ++ | + | + | Fair | Small sample size for analyses. |

| Study ID | Study Design | Section 1: Population | | | Section 2: Method of group selection | | | Section 3: Outcomes | | | Section 4: Analyses | | | Section 5: Summary | | | Overall quality grade | Comments | | | |
|------------------------------|---------------|-----------------------|-----------------------------|---------------------------|--------------------------------------|-----------------------|-----------------------|---------------------------------|--|-----------------------|---------------------------|----------------------------|-------------------------------|----------------------|--------------------------------|-------------------------|-----------------------|----------|---------------|--------------------|--|
| | | 1.1 Source well desc. | 1.2 Eligible pop well desc. | 1.3 Selected rep eligible | 2.1 How selection bias minim | 2.2 Theoretical basis | 2.3 Contamination low | 2.4 Confounding id & controlled | 3.1 Outcome measures & procedures reliable | 3.2 Measures complete | 3.3 Imp outcomes assessed | 3.4 Follow-up time similar | 3.5 Follow-up time meaningful | 4.1 Sufficient power | 4.2 Multiple explan. variables | 4.3 Methods appropriate | | | 4.4 Precision | 5.1 Internal valid | 5.2 Generalisable |
| 9. Lima et al. (2017) | Questionnaire | ++ | - | - | NR | - | NA | - | - | NR | + | NA | NA | ++ | - | ++ | + | + | - | Poor | Population biased – predominantly white, female, and single. Model fit only adequate. 3 of the 5 QUEGE subscales are unstable. |
| 10. Marazziti et al. (2010a) | Questionnaire | ++ | + | - | NR | + | ++ | ++ | + | NR | + | NA | NA | - | - | - | + | - | - | Poor | |
| 11. Marazziti et al. (2003a) | Questionnaire | ++ | ++ | + | + | + | ++ | ++ | + | ++ | ++ | ++ | ++ | + | ++ | ++ | ++ | + | + | Fair | Comparison study. Sample differs from general population. |

| Study ID | Study Design | Section 1: Population | | Section 2: Method of group selection | | | Section 3: Outcomes | | | | Section 4: Analyses | | | Section 5: Summary | | | Overall quality grade | Comments | | | |
|------------------------------|---------------------------|-----------------------|-----------------------------|--------------------------------------|------------------------------|-----------------------|-----------------------|---------------------------------|--|-----------------------|---------------------------|----------------------------|-------------------------------|----------------------|--------------------------------|-------------------------|-----------------------|----------|---------------|--------------------|--|
| | | 1.1 Source well desc. | 1.2 Eligible pop well desc. | 1.3 Selected rep eligible | 2.1 How selection bias minim | 2.2 Theoretical basis | 2.3 Contamination low | 2.4 Confounding id & controlled | 3.1 Outcome measures & procedures reliable | 3.2 Measures complete | 3.3 Imp outcomes assessed | 3.4 Follow-up time similar | 3.5 Follow-up time meaningful | 4.1 Sufficient power | 4.2 Multiple explan. variables | 4.3 Methods appropriate | | | 4.4 Precision | 5.1 Internal valid | 5.2 Generalisable |
| 12. Marazziti et al. (2010b) | Questionnaire | ++ | - | - | - | ++ | NR | ++ | + | + | ++ | - | - | ++ | - | ++ | ++ | + | - | Poor | Subscale 'interpersonal sensitivity' – mix of controlling behaviours and anxiety. No test-retest reliability. Item allocation problematic. |
| 13. Michael et al. (1995) | Questionnaire | ++ | - | + | + | ++ | + | - | ++ | ++ | ++ | ++ | ++ | + | ++ | ++ | + | ++ | + | Fair | |
| 14. Mullen & Martin (1994) | Questionnaire | ++ | ++ | ++ | + | ++ | NR | ++ | ++ | ++ | ++ | NA | NA | ++ | ++ | ++ | + | ++ | ++ | Good | |
| 15. Musalek et al. (1989) | Review of medical records | ++ | ++ | ++ | NR | + | ++ | + | ++ | ++ | + | ++ | ++ | ++ | + | ++ | + | ++ | ++ | Good | Patients only. |

| Study ID | Study Design | Section 1: Population | | | Section 2: Method of group selection | | | Section 3: Outcomes | | | Section 4: Analyses | | | Section 5: Summary | | | Overall quality grade | Comments | | | |
|--|---|-----------------------|-----------------------------|---------------------------|--------------------------------------|-----------------------|-----------------------|---------------------------------|--|-----------------------|---------------------------|----------------------------|-------------------------------|----------------------|--------------------------------|-------------------------|-----------------------|----------|---------------|--------------------|---|
| | | 1.1 Source well desc. | 1.2 Eligible pop well desc. | 1.3 Selected rep eligible | 2.1 How selection bias minim | 2.2 Theoretical basis | 2.3 Contamination low | 2.4 Confounding id & controlled | 3.1 Outcome measures & procedures reliable | 3.2 Measures complete | 3.3 Imp outcomes assessed | 3.4 Follow-up time similar | 3.5 Follow-up time meaningful | 4.1 Sufficient power | 4.2 Multiple explan. variables | 4.3 Methods appropriate | | | 4.4 Precision | 5.1 Internal valid | 5.2 Generalisable |
| 16. Orti-gue & Bianchi - Demic heli (2011) | Review of Patient records and Brain Imaging | ++ | ++ | ++ | ++ | ++ | ++ | + | ++ | ++ | ++ | NA | NA | + | - | ++ | + | ++ | + | Fair | Delusional patients only. Excluded schizo/alcohol abuse. |
| 17. Paolini et al. (2016) | Review of patient records, and test battery | ++ | + | ++ | ++ | ++ | NA | ++ | ++ | ++ | ++ | NA | NA | + | + | + | ++ | ++ | ++ | Good | Delusional patients only. Bias - predominantly U.S. African-American. |
| 18. Rodriguez et al. (2015) | Questionnaire and clinical assessment | + | - | + | - | + | + | - | - | + | + | NA | NA | - | - | - | - | - | - | Poor | |
| 19. Rydell & Bringle (2004) | Questionnaire | ++ | NR | ++ | - | + | NR | + | + | NR | - | NA | NA | + | + | + | - | + | + | Fair | |

| Study ID | Study Design | Section 1: Population | | Section 2: Method of group selection | | | | Section 3: Outcomes | | | | Section 4: Analyses | | | | Section 5: Summary | | | Comments | | |
|---------------------------|---------------------------|-----------------------|-----------------------------|--------------------------------------|------------------------------|-----------------------|-----------------------|---------------------------------|--|-----------------------|---------------------------|----------------------------|-------------------------------|----------------------|--------------------------------|-------------------------|---------------|--------------------|----------|-------------------|---------------------------------|
| | | 1.1 Source well desc. | 1.2 Eligible pop well desc. | 1.3 Selected rep eligible | 2.1 How selection bias minim | 2.2 Theoretical basis | 2.3 Contamination low | 2.4 Confounding id & controlled | 3.1 Outcome measures & procedures reliable | 3.2 Measures complete | 3.3 Imp outcomes assessed | 3.4 Follow-up time similar | 3.5 Follow-up time meaningful | 4.1 Sufficient power | 4.2 Multiple explan. variables | 4.3 Methods appropriate | 4.4 Precision | 5.1 Internal valid | | 5.2 Generalisable | 5.3 Overall quality. grade |
| 20.Silva et al. (1998) | Review of medical records | + | NR | + | - | + | + | NA | + | + | ++ | ++ | ++ | NA | ++ | + | + | ++ | + | Fair | |
| 21.Soyka & Schmidt (2011) | Review of medical records | ++ | ++ | ++ | ++ | ++ | ++ | ++ | + | NR | ++ | NR | NR | ++ | ++ | ++ | + | ++ | ++ | Good | |
| 22.Soyka et al. (1991) | Review of medical records | ++ | ++ | + | + | ++ | ++ | + | + | ++ | ++ | NR | NR | ++ | ++ | ++ | + | ++ | ++ | Good | |
| 23.Swami et al. (2012) | Review of medical records | + | - | + | - | - | - | - | - | NR | + | NR | NR | + | - | + | - | + | - | Poor | |
| 24.TARRIER et al. (1989) | Review of medical records | + | + | + | - | - | - | - | + | + | + | NA | NA | + | + | + | + | + | - | Poor | No cross check for co-morbidity |

| Study ID | Study Design | Section 1: Population | | | Section 2: Method of group selection | | | Section 3: Outcomes | | | Section 4: Analyses | | | Section 5: Summary | | | Overall quality grade | Comments | | |
|------------------|---------------|-----------------------|-----------------------------|---------------------------|--------------------------------------|-----------------------|-----------------------|---------------------------------|--|-----------------------|---------------------------|----------------------------|-------------------------------|----------------------|--------------------------------|-------------------------|-----------------------|----------|---------------|--|
| | | 1.1 Source well desc. | 1.2 Eligible pop well desc. | 1.3 Selected rep eligible | 2.1 How selection bias minim | 2.2 Theoretical basis | 2.3 Contamination low | 2.4 Confounding id & controlled | 3.1 Outcome measures & procedures reliable | 3.2 Measures complete | 3.3 Imp outcomes assessed | 3.4 Follow-up time similar | 3.5 Follow-up time meaningful | 4.1 Sufficient power | 4.2 Multiple explan. variables | 4.3 Methods appropriate | | | 4.4 Precision | 5.1 Internal valid |
| 25. White (1981) | Questionnaire | + | - | + | - | + | + | - | + | + | NA | NA | - | - | + | + | + | + | Fair | Very small sample for SEM, biased sample |

N.B. Studies were graded as *good* where both internal validity and generalisability received a *good* grade, *fair* where only one of these received a good or both received a *fair* grade, and *poor* where either internal validity or generalisability were graded as *poor*. SEM refers to Structural Equation Modelling.

1. Distinctions between Psychiatric Illness v Biological Neuropathology

Clinical jealousy cases have been traced to a range of neurological complications including right cerebrovascular disorders (45%), cerebellar infarctions (10%), mesencephalothalamic cerebral ischaemia (10%), Parkinson's disease (15%), rhinencephalic lesions (10%) and drug treatment (10%) (Ortigue & Bianchi-Demicheli, 2011). Most reported clinical cases of jealousy occurring after a stroke, are typically to the right-hemisphere (Ortigue & Bianchi-Demicheli, 2011), an area increasingly associated with emotion, moral judgement, mental state reasoning, false beliefs and delusions (Young, Camprodon, Hauser, Pascual-Leone, & Saxe, 2010; Young, Cushman, Hauser, & Saxe, 2007). Right brain lesions and damage are associated with negative emotional states and false beliefs, delusions and the misreading of other people's intentions. Ortigue and Bianchi-Demicheli (2011) suggest damage to the right side of the brain leads to a lack of regulation of the left side of the brain, which allows verbalisation of misperceptions and an escalation of jealous emotional states. They suggest delusional jealousy is due to flaws in false-belief psychological systems. Ortigue and Bianchi-Demicheli (2011) suggest the brain areas involved in jealousy are also those involved in mentalising, behaviour interpretation and prediction, the understanding of other's intentions, and false beliefs. These are the temporo-parietal junction, posterior temporal sulcus, angular gyrus and inula, and are involved in both the formation of false-beliefs and jealousy. Although other areas of the brain are involved in social cognition, specifically emotion processing, executive functioning (action monitoring, attention, dual task monitoring, episodic memory retrieval) these did not overlap with the regions activated during jealousy. Both reported studies find similar brain areas are involved in suspicious jealousy to those involved with mentalisation, and the interpretation of others' behaviour. The brain systems involved with jealousy appear

consistent with those involved with other types of false belief, self-reference, delusions, the prediction of other's actions and intentions, and emotional processing

Only one study reported a neural basis for normal jealousy: Takahashi et al. (2006) used qualified gender-blind raters to confirm fMRI image reports. Raters reported the brain areas involved in jealousy are also those involved in other types of false belief. They found whereas jealousy involves similar emotions, fear, anxiety and anger in both genders, jealousy in men involves activation of the visual cortex, the limbic system and those areas related to this (hypothalamus, amygdala, hippocampal regions) and also the inula. The relationship to activation of the inula in this study was confirmed by a regression analysis that showed a positive correlation between inula activation and the level of males' subjective jealousy. Different areas more associated with the interpretation of others' intentions, self-representation, and theory of mind, including the posterior superior temporal sulcus (pSTS) and angular gyrus were activated in women. Additional areas involved were the visual cortex, frontal regions (middle frontal gyrus), thalamus and cerebellum. In females, self-ratings of jealousy were associated with activation of the pSTS. Although the research finds sexual and emotional jealousy are differently salient for each gender, the first part of the study indicates both genders had identical results in ratings of both sexual and emotional jealousy, for the fMRI part of the study only sexual jealousy was induced. A further limitation is participants were aware the scenarios were hypothetical. This study is the only one of its kind, and therefore, further studies are needed to confirm the neural correlates of normal jealousy.

2. Characteristics of Jealous Cognition

The following phenomenological features paralleling those of paranoia were

identified:

2.1 Continuum/Spectrum. Thirteen studies (Studies 1, 2, 3, 7, 9, 10, 11, 12, 13, 14, 21, 22 & 24) indicate that jealousy, like paranoia, may occur on a continuum within the population. In clinical populations when symptom-specific rather than diagnosis-specific sampling is used, the prevalence of jealousy is much higher than primary diagnoses would indicate (Studies 21 & 22). In the general population, jealousy was found to range from normal to pathological with escalating degrees of intensity, severity and frequency (see Study 10: Parker & Barrett, 1997). Furthermore, jealous thinking ranged from infrequent thoughts based on good evidence of a threat to a valued relationship (i.e., reactive (normal) jealousy, see Theory Chapter) to persistent, intense and invasive delusions that the partner is unfaithful or considering infidelity, as seen in cases of Othello syndrome (Studies 16 & 24).

There is a notable gap between the number of papers retrieved that study irrational jealousy in normal populations and those that study pathological jealousy in clinical populations. Only four papers (Studies 9, 10, 12 & 24) explore excessive or irrational jealousy in the general population, where increasing levels of ideation might be anticipated. Three of these studies found psychopathological dimensions of jealousy within the normal population's experience of jealousy (Studies 9, 11 & 12), which is indicative of a population continuum. The dimensions found show a high degree of collinearity, which may indicate an underlying second-order factor (Studies 9 & 12). There are few studies of problematic jealous cognition in the normal population, and none identify the content, frequency or reasons for persistence of jealous ideations.

2.2 Delusional theme malleability. Large-scale reviews of patient records suggest delusional jealousy spans multiple traditional diagnostic categories and co-

occurs with other delusional themes (Studies 16, 17, 20, 21 & 22). There are very high rates of thematic overlap, 78.3% (Study 21) and 95% (Study 20) for delusions and hallucinations. No studies explored ideational themes, so it was not possible to determine whether different ideational themes were similarly malleable, although psychosis was frequently a pre-cursor to delusional states (Study 20). The co-occurrence suggests a mechanism underlying delusion as opposed to differing aetiologies for various delusions. However, contradictory evidence using principal components analysis (PCA) suggests clinical delusions form groups with separate aetiologies, and furthermore that paranoid and jealous delusions form distinct groupings that include negative affect (jealousy, sin and guilt) and paranoia (persecutory delusions and delusions of reference) (Study 17).

2.3 Interpersonal conflict/distress. Two papers explored interpersonal conflict or distress as trigger events for the onset of jealous ideation or delusion. One of these found that 15% of partners became irrationally jealous due to distress concerning general life stressors unrelated to their partner (Study 14). One further study found a link between the onset of jealousy delusions (first episode psychosis including jealousy) and interpersonal abuse and environmental violence (e.g., Living in an unsafe and violent neighbourhood, and violence exposure at school) (Study 17).

2.4 Otherwise normal cognitive performance. Four studies involved screening participants who were suspiciously jealous for additional psychiatric symptoms and illegal drug use. One study found delusional patients (a subsection of the full study with jealous themes, n=25) had otherwise normal cognitive performance (Study 17). Participants were found to have normal cognition except for the delusions. Overall the papers suggest across both normal and clinical populations, suspicious jealousy is

unrelated to abnormal cognitive performance (Studies 10, 11, 12 & 17).

Table 3. Summary of jealousy features related to the general characteristics of paranoia.

| Study # Authors (Year) | Spectrum | Delusional/ideational theme malleability | Interpersonal conflict/distress | Otherwise normal cognitive performance |
|---|----------|--|---------------------------------|--|
| Study 1 Buunk (1997) | X | | | |
| Study 2 Carson & Cupach (2000) | X | | | |
| Study 3 Crowe et al. (1988) | X | X | | |
| Study 5 DiBello et al. (2014) | | | X | |
| Study 7 Dutton et al. (1996) | X | | | |
| Study 9 Lima et al. (2017) | X | | | |
| Study 10 Marazziti et al. (2010b) | X | | | X |
| Study 11 Marazziti et al. (2003a) | X | | | X |
| Study 12 Marazziti et al. (2010a) | X | | | X |
| Study 13 Michael et al. (1995) | X | X | | |
| Study 14 Mullen & Martin (1994) | X | | X | |
| Study 16 Ortigue & Bianchi-Demicheli (2011) | | X | | |
| Study 17 Paolini et al. (2016) | | X | | X |
| Study 20 Silva et al. (1998) | | X | | |
| Study 21 Soyka & Schmidt (2011) | | X | | |
| Study 22 Soyka et al. (1991) | X | X | | |
| Study 24 TARRIER et al. (1989) | X | | | |

3. Features related to Cognition

Like paranoia, jealousy frequently involves beliefs with little basis in consensual reality, misreading of others' intentions, and in more severe cases, delusional beliefs (Iacoboni et al., 2005). The next section reviews dimensions of erroneous social cognition, and cognitive bias found in both jealousy and paranoia.

3.1 False Belief. Although the notion of irrational or excessive jealousy implicitly suggests false understandings, eight studies explicitly explored the false beliefs of jealous people. In community samples, jealousy without just cause was admitted by 40% of participants (Study 16). In some cases, people believed their partners were unfaithful when they were not; some only had these beliefs when drunk, but others also when sober (Study 13). Those with higher levels of reality-testing problems were more likely to be jealous (Study 7) and to have significantly higher verbal and physical assaultiveness (Study 6). Four papers suggest irrational jealousy, delusion or morbidly jealous thoughts are based in false or unfounded beliefs about the partner's relationship commitment (Studies 1, 19, 23 & 24).

3.2 Social cognition: Interpersonal suspicion & misperception of others' intentions toward the self. Analysis of both the results and item content of the eight studies included in this section provide suggestions about how interpersonal suspicion and jealousy may be related. Findings indicate jealousy (Studies 10, 13, 17, 23 & 24), its severity and frequency (Studies 11, 12 & 14), mental pathology (Study 12), and in particular, increased interpersonal suspicion, is correctly predicted by both cognitive and behavioural items in jealousy scales. Therefore, these two types of jealousy may be a single irrational jealousy form indicated by suspicious thinking and escalating aggression, partner surveillance and controlling behaviour. Those with diagnoses of delusional and hallucinatory jealousy were also suspicious of their partner (Studies 20

& 22). Increased interpersonal suspicion is linked to measured anxiety, more specifically anxious insecure attachment (Studies 1 & 19) (see section 4.4.1), greater insecurity (Study 19), neuroticism, and social anxiety (Study 1). Decreased partner trust was related to increased rumination, people with lowered levels of partner trust are less able to control suspicious thoughts (Study 2). Interpersonal suspicion was related behaviourally with drinking problems (Study 5) and hostility (Studies 1 & 17). Misperception of others' intentions was related to increased rumination (Study 2). One clinical study (Study 16) found patients frequently misread others' intentions toward them.

3.3 Thinking biases. Surprisingly, only one paper explored cognitive bias in irrational or excessive jealousy, given their importance in the generating of other delusions and ideation. Rather than exploring general reasoning biases that have a known association with other forms of ideation, the research explored a little-known bias (the 'love-is-blind' bias). This is the tendency of people who are romantically involved to perceive their partner as attractive (Swami et al., 2012), finding that this predicts anxious jealousy (Study 23).

3.3.1 Bias associated with paranoid thinking (strong confirmation bias). No retrieved papers explored any attentional, or reasoning biases usually associated with paranoid or psychotic belief formation and maintenance, (e.g., the jumping-to-conclusions bias, heightened attention to threat, negative attentional bias, elevated recall of threatening situations, Fear, Sharp, & Healy, 1996; Garety & Freeman, 1999, 2003; Kaney & Bentall, 1989), self-serving and externalising biases (Garety & Freeman, 1999; Kinderman & Bentall, 2000) in jealousy populations. Therefore, it is difficult to establish the importance of these types of thinking bias in jealousy.

3.3 Lack of reality/evidence testing. Definitionally, irrational jealousy suggests a lack of evidence for judgements of partner infidelity (Study 20). Where studies or case histories attempted to check, any spousal infidelity was unsubstantiated (Studies 22 & 23). Borderline personality organisation has been linked to increased levels of jealousy and intimate partner violence. One research paper that indirectly explored reality testing, as part of an exploration of jealousy and Borderline Personality Organisation (BPO), demonstrated a link between increased BPO Symptoms, increasing levels of jealousy, and lowered reality testing. High and Low BPO showed clear differences on subscale scores for reality-testing, those with higher levels of BPO demonstrated lower levels of reality testing (Studies 6 & 11); variability in levels of awareness of this lack was predicted by increasing pathology (Study 11). Therefore, there is a potential for a link between increasing jealousy and reduced reality-testing. Although it is not a formal test of confirmation bias such as the 'jumping to conclusions' bias, patients appear to put together minor evidence from different sources and draw major conclusions from it (Study 16) also irrelevant trivial events are seen as evidence of infidelity (Study 20). These findings show a strong confirmation bias, consistent with the presence of a paranoid dimension (|according to paranoia models, reviewed above).

3.4 Belief inflexibility/rigidity. Sufferers of all jealousy types showed moderate correlations with belief rigidity as a personality variable (Study 1). One study (Study 11) proposed jealousy has certainty/uncertainty dimensions, with greater levels of belief certainty (measured by the Y-BOCS) linked to less flexible thinking. Belief certainty has much similarity with the concept of belief inflexibility known to play a role in the maintenance of paranoid beliefs.

3.5 Obsessiveness. Jealous rumination (ideation) has been defined as obsessive

(Study 2). Jealousy as the focus of obsession is related to reported jealousy and checking on the partner (Study 10). The time spent in jealous thought establishes both a continuum and also distinguishes between healthy people (checking 1 – 4 hrs per day) and those who had obsessional jealous ideation (clinical patients with Obsessive Compulsive Disorder (OCD), checking between 4 – 8 hrs per day) (Study 11). However, subscale measures of obsessional jealousy using a scale developed in Study 12 suggest this subscale is measuring normal, not obsessive jealousy, because cross-validation with a clinical measure of psychopathology (including obsession) with established psychometric properties showed no correlation with obsession or any other mental-health pathology (Study 17).

Table 4. How the cognitive aspects of jealousy map onto paranoia characteristics.

| Study # Authors (Year) | False Belief | Interpersonal suspicion | Misperception of others' intentions | Lack of evidence/reality testing | Thinking bias | Belief inflexibility/rigidity | Obsessiveness |
|--|--------------|-------------------------|-------------------------------------|----------------------------------|---------------|-------------------------------|---------------|
| Study 1. Buunk (1997) | X | X | | | | X | |
| Study 2. Carson & Cupach (2000) | | X | X | | | | X |
| Study 5. DiBello et al. (2014) | | X | | | | | |
| Study 6. Dutton (1994) | X | | | X | | | |
| Study 7. Dutton et al. (1996) | X | | | | | | |
| Study 9. Lima et al. (2017) | | X | | | | | X |
| Study 10. Marazziti et al. (2010b) | | X | | | | | X |
| Study 11. Marazziti et al. (2003a) | | X | | X | | X | X |
| Study 12. Marazziti et al. (2010a) | | X | X | | | | |
| Study 13. Michael et al. (1995) | X | X | | | | | |
| Study 14. Mullen & Martin (1994) | X | X | | | | | |
| Study 16. Ortigue & Bianchi-Demicheli (2011) | X | | X | X | | | |
| Study 18. Rodriguez et al. (2015) | | X | | | | | |
| Study 19. Rydell & Bringle (2004) | X | X | | X | | | |
| Study 20. Silva et al. (1998) | | X | X | X | | | |
| Study 21. Soyka et al. (1991) | X | X | | X | | | X |
| Study 23. Swami et al. (2012) | X | X | | X | X | | |
| Study 24. Tarrrier et al. (1989) | X | | | | | | |
| Study 25. White (1981) | | X | | | | | |

4. Features Related to Affect

4.1 Affect regulation difficulties. Two studies (Studies 6 & 14) suggest people with higher levels of jealousy also struggle to regulate emotion. Those higher in measured jealousy had significantly more difficulty regulating both anxiety and anger (Study 6), and greater distress (Study 14). Alexithymia is the inability to identify and name experienced emotions. It has a well-established link with affect regulation (Connelly & Denney, 2007; Kauhanen, Kaplan, Cohen, Julkunen, & Salonen, 1996). One further study in the review found that participants with high scores for alexithymia were likely to express jealousy in pathological and suspicious ways (Study 8).

4.2 Depression. Those with higher levels of jealousy were more depressed (Studies 6 & 7). In normal samples, a tendency to depression was linked with a paranoid jealousy subscale (Study 17). High aggression was also related to depression and high BPO (Study 7). Depression and delusional jealousy also overlap in clinical patients with a proportion suffering both (Study 16).

4.3 Anger. Participants with high levels of jealousy also expressed more anger (Study 13). A high percentage (60%) of patients in one study of people receiving in-patient psychiatric care, patients had homicidal ideation towards their spouse (Study 20) and for people referred or self-referred for partner abuse, increasing BPO is correlated with increasing anger frequency, duration, and intensity (Study 6). Anger related to jealousy links with various thought processes including rumination and hostility toward the romantic partner (Study 2). Although they relate jealousy to aggression, the anger measures used in one study (Study 3) appear unreliable, with the study measuring passivity and not aggression.

4.4 Anxiety. One of the most persistent and substantiated links found is that

jealous ideation, like paranoid ideation, is linked with higher levels of anxiety, (Studies 1, 3, 6, 7, 10, 13, 18, 19, 23), and related affect such as stress (Study 14), worry (Study 25), insecurity (Study 19), and is moderately correlated with neuroticism (Study 1), anxiety disorders and especially social anxiety (Study 1). This link persists in more extreme forms of morbid jealousy (Studies 13 & 24). Those higher in anxiety or related affect also suffered from increased rumination (Study 2). Men who assaulted their wives were increasingly assaultive with increasing anxiety (Study 6). However, one study found no link for a paranoid jealousy subscale with a clinical measure of anxiety (Study 17). Most of the research is consistent with current models of psychosis and paranoia reviewed above and is therefore suggestive of a link between anxiety and suspiciousness.

4.4.1 Attachment anxiety. Two studies, mentioned in section 3.2., found links between jealousy and anxious insecure attachment (Studies 1 & 19). Insecure attachment due to disruptions in early caregiver relationships has been applied to adult close relationships (e.g., Hazan & Shaver, 1987; Senchak & Leonard, 1992) where individuals with insecure attachment styles report more jealousy (Hazan & Shaver, 1987). Anxious attachment, where inadequate care and security in formative relationships results in anxiety and fear of abandonment in adult relationships, has frequently been theorised to relate to both jealousy (Buunk, 1997) and paranoia (Berry et al., 2008; MacBeth et al., 2008) and may therefore constitute a distal influence upon increased levels of suspiciousness. However, whilst many studies infer a theoretical link between current levels of participant attachment anxiety and jealousy (or paranoia), due to methodological weaknesses in the studies it is not clear that the anxiety measured originates in attachment problems or whether it is general anxiety with a different cause. Studies often do not control for general anxiety and make assumptions that the

measures used are discretely measuring attachment anxiety rather than general anxiety. Furthermore, studies do not include longitudinal measurement of attachment anxiety in both childhood and subsequent adult romantic relationships, which would enable conclusions about attachment style or anxiety to be able to be drawn with greater confidence. It is generally understood that measures which rely on recall, in this case of early childhood memories may suffer from a lack of fidelity due to the problems with accurate recall over time. Many measures designed to measure anxious attachment, use items that are analogous to those which might be expected to measure more general anxiety.

Although there is research that suggests jealousy is related to attachment within a particular romantic relationship (Knobloch et al., 2001). There are a number of problems with the way that anxious attachment is operationalised in much research, i.e., as a measure of attachment that is hypothesised to originate in childhood caregiver relationships. There are two main methodological weaknesses with most studies of attachment anxiety. Firstly, attachment anxiety is not operationalised in a way that would establish that an individual displays anxious attachment across their adult romantic relationships, as one might expect if attachment anxiety originates in childhood. Secondly, there are no cohort studies of jealousy development where attachment is measured in infancy with subsequent measurement of the same participant in adulthood. Rather, studies tend to measure childhood caregiver attachment and current adult romantic attachment concurrently. Furthermore, where anxiety, attachment and attachment anxiety have been measured and the contribution of each to jealousy has been determined, the findings suggest that attachment anxiety makes no additional contribution to current levels of jealousy above that which can be accounted for by anxiety alone (Clanton & Kosins, 1991; Kosins, 1983). In conclusion, whilst attachment

anxiety as a distal cause of jealousy is a plausible explanation, and therefore is retained in the model in Chapter 7. A general lack of rigour when measuring attachment anxiety means that the extent to which anxious attachment is a true influence on the current level of either jealousy or paranoia is difficult to ascertain.

Figure 5. Affective characteristics of jealousy that map onto the affective correlates of paranoia

| Study # Authors (Year) | Affect regulation difficulties | Depression | Anger | High anxiety |
|--|--------------------------------|------------|-------|--------------|
| Study 1. Buunk (1997) | | | | |
| Study 2. Carson & Cupach (2000) | | | X | X |
| Study 3. Costa et al. (2015) | | | X | X |
| Study 6. Dutton (1994) | X | X. | X | X |
| Study 7. Dutton et al. (1996) | | X | | X |
| Study 8. Hesse et al. (2016) | X | | | |
| Study 9. Lima et al. (2017) | | X | X | X |
| Study 10. Marazziti et al. (2010b) | | | | X |
| Study 13. Michael et al. (1995) | | | X. | X |
| Study 14. Mullen & Martin (1994) | X | | X | X |
| Study 16. Ortigue & Bianchi-Demicheli (2011) | | X | | |
| Study 17. Rodriguez et al. (2015) | | | | X |
| Study 19. Rydell & Bringle (2004) | | | | X |
| Study 20. Silva et al. (1998) | | | X | |
| Study 23. Swami et al. (2012) | | | | X |
| Study 24. TARRIER et al. (1989) | | | | X |
| Study 25. White (1981) | | | | X |

5. Mental Health Difficulties

5.1 General. A study of jealous and non-jealous delusions in psychiatric patients admitted for alcohol problems found that secondary psychiatric morbidity was significantly higher in the jealous group, who continued to be jealous when sober, 37 of 50 patients, compared to 5 of 20 who had no secondary morbidity (Study 13).

5.2 Substance abuse. Substance abuse disorder is the predominant diagnosis in 6.9% of cases of delusional jealousy (Study 21), although partner assaulters whose jealousy increased with increasing levels of BPO showed no relationship between high and low BPO and substance use (Study 6).

5.2.1 Illicit drug use. Four studies (Studies 6, 17, 20 & 21) explore the impact of drug use on jealousy and suggest drug use has little impact or influence on the experience of jealousy. In four case studies, the person who had delusional jealousy also used illicit drugs, in one case, amphetamine and in three cases, cannabis (Study 20). Study 17, which segmented drug-use types, found only cannabis or stimulant-use (not cocaine, alcohol or other substance use) were associated with jealousy rather than other delusion-types, which may explain the findings of more comprehensive studies with larger samples that suggest substance abuse is a factor in only 6.9% of cases of delusional jealousy (Study 21).

5.2.2 Excess alcohol consumption. Five studies show a relationship between alcohol problems and jealousy (Studies 5, 6, 13,14 & 20); however, two clinical studies (Studies 17 & 21) find no association. Drinking problems (Studies 5 & 6) are related to jealousy and suspicious, hostile aspects of jealousy (Study 5). In one study, 37% of participants with alcohol problems were also likely to be jealous (Study 13). Those higher in jealousy were also far more likely to have hazardous levels of current alcohol

consumption, high jealousy 24.2% v low 8.2% (using Royal College of Physician's criteria, Study 14) and where they were delusional or hallucinatory, 11 of 20 patients also had alcohol abuse history (Study 20). The findings for a link between alcohol consumption and jealousy are mostly in favour of a link but show inconsistencies.

5.3 Depression and anxiety disorders. These are reported on p.56.

5.4 Psychosis. Two studies (12 & 17) found psychotic traits related to irrational jealousy in the general population. Study 12 used the Eysenck Personality Inventory: EPI, (Eysenck & Eysenck, 1968) which is not a clinical measure of psychosis but may indicate some symptoms of paranoia, and a re-interpretation of the data in Lima et al. 2016 (Study 17) suggests that all sub-scales measuring abnormal jealousy link significantly with a clinical measure of paranoid ideation and psychoticism, with partner-control items (the inaccurately worded interpersonal sensitivity subscale) differentiating between those with only ideation and those who have significant psychoticism scores. Those with paranoid ideation were significantly more likely to endorse partner-control items. Psychosis, schizophrenia (Studies 4, 21 & 22), schizotypy and delusional states (Study 21) were related to jealousy in clinical groups. Jealousy in these groups showed high levels of comorbidity with psychotic symptoms. Psychotic symptoms continued to be present in the clinical samples with increasing severity and prevalence of jealousy related to increasing levels of severity and prevalence in psychotic symptoms. Despite the tendency for fewer people to be diagnosed with delusional jealousy compared to other psychotic groups, there are increasing levels of severity and delusional states. Furthermore, psychotic symptoms also continue into forensic populations with psychosis, and schizophrenia (Study 20) present in these groups.

Six clinical studies (Studies 4, 13, 17, 20, 21 & 22) found an overlap between psychosis and jealousy at varying degrees of severity and frequency. People who have delusional jealousy and also secondary morbidity are far less likely to be diagnosed with mood disorders. However, there is an extremely high overlap with other delusional disorders (78.3% of the cases) (Study 21). The most common diagnoses for those also suffering excessive jealousy in clinical populations are psychosis, schizophrenia, paranoid delusions (Study 22), with psychotic processes found to precede the onset of jealous delusions (Study 20). One study involving a close re-examination of the case notes of all jealous patients admitted to a large psychiatric hospital, indicated psychosis was present in the entire sample. Paranoid jealousy was present in 0.17% of all psychiatric inpatient admissions over a 61-year period, with older populations likely to have a higher incidence. Follow-up data for those admitted with delusions indicated that any continuing mental health problems were psychotic: 12/37 jealous patients had recovered, 19/51 non-jealous (never mentioned delusion again) at follow-up, 23 jealous and 42 non-jealous were still delusional, two jealous, eight non-jealous had developed schizophrenia. Interestingly, where the patient continued to be delusional, the dominant theme persisted. Only three developed hallucinations: one jealous, three non-jealous; schizophrenia accounted for the majority of re-diagnosis in both patient groups. A further study (Study 4) found psychosis was the primary diagnosis for those suffering excessive or irrational jealousy and admitted for in-patient psychiatric care. Functional psychoses account for most cases of delusional jealousy. Delusional jealousy is frequently a significant component of schizophrenia, schizoaffective and psychotic disorder due to medical conditions and psychotic disorders not otherwise specified. Delusional jealousy rarely exists alone; it is typically found alongside other psychotic symptoms and delusions (Study 20).

Very few patients admitted to psychiatric hospitals were diagnosed with paranoid jealousy (Study 17). This is largely due to severe or delusional jealousy not being the primary diagnosis or feature of the psychiatric morbidity, and therefore jealousy does not appear as the diagnosis, but only within the patients' case records. So, although jealousy may be a significant feature of a person's psychiatric problems and also of interest to researchers, the primary classification or diagnostic category frequently masks a more complex underlying pattern of symptoms. This feature of psychiatric categorisation and diagnosis makes it difficult to identify all those who might be suffering from extreme or irrational forms of jealousy. One further study (Study 13) reported higher levels of unspecified delusional disorder (those other than persecutory), in those who were irrationally jealous.

6. Other

6.1 Trauma symptoms. Two studies found evidence of trauma symptoms in forensic populations with irrational jealousy (Studies 6 & 7). The studies do not give further detail of the type of trauma symptoms suffered. However, Study 17 indicates all forms of childhood abuse and environmental violence are linked with all first-episode clinical delusions, including jealousy.

6.2 Low/negative self-esteem. There is strong but inconsistent evidence for a relationship between low self-esteem and jealousy. Six studies found a relationship between self-esteem and jealousy and one found no relationship. Clinical observations suggest jealousy delusions are linked to low self-esteem (Studies 17 & 24) and vary with subjective feelings of insecurity and low self-confidence (Study 24), and several correlational studies found lower self-esteem is associated with higher levels of jealousy (Studies 1, 10, 12 & 17). One study found impaired self-esteem was present in 63% of

those in the subgroup with high jealousy scores, who were also more likely to respond with anger (Study 14). However, one study found weak correlations between SE and irrational jealousy (Study 19), a further study found no significant correlations between jealousy and self-esteem, and one further study found partner's perceived relationship dissatisfaction was related to the other partner's own perceived inadequacy (Study 25). These results suggest that the relationship of jealousy to self-esteem is complex and that relationship quality might act as a mediating or moderating variable.

6.3 Hostility/Aggression/Violence. There is substantial evidence that jealousy and hostility are linked across all sample groups (Studies 1, 2, 3, 7, 13, 14, 16, 17, 18, 20, 21, 24 & 25). In the general population, jealous people are more likely to threaten their partner with violence, to strike their partner, use threatening behaviour (7.9% v 0%), or physical aggression (4.5% v 0.6%). Both genders (15.4% of the total) reported having been subjected to physical aggression from a partner due to jealousy (Studies 24 & 25). Additionally, those higher in jealousy were more likely to be intrusive and emotionally abusive to a partner (Study 7).

There are suggestions that any relationship to partner aggression is indirect and due to alcohol use (Study 5) or more likely mental ill-health, as rumination (Study 2), distrust, anxiety, and jealousy, predict hostility towards a partner (Study 18) and high, compared to low scorers, on the General Health Questionnaire (GHQ) (a robust indicator of mental health) were more threatening to their partner, (8.6% v 2.2%) and were openly aggressive (6.2% v 1.1%) (Study 14). Furthermore, all BPO subscales predicted hostility towards a partner (Study 6), and hostility is associated with anxious and irrational (but not reactive/normal) jealousy (Study 1), for both men ($r=0.28$), and women ($r=0.22$).

There is tentative support for the idea that aggression is motivated not by jealousy but by a mechanism underlying the delusional or psychotic state. High numbers of patients with delusional jealousy are also generally aggressive (15 of 72 patients, 20.8%) (Study 21). In one study of clinical jealousy, 65% had threatened to kill their spouse, 60% had harmed their spouses, and 25% were also generally violent (Study 20); positive symptoms of schizophrenia (associated with violence) (Study 21), delusional jealousy is associated with partner hostility (Study 16), homicide (Study 21), and aggression (Studies 16 & 21). One study found a delusional jealous group was more often involved in verbal (88%) and physical (45%) violence towards their spouses than the non-jealous group (20% and 11% respectively). Importantly, these findings suggest that violence towards a spouse is likely to be connected to the presence of delusion and not simply to jealousy itself. In the study, alcoholic partners' violence was seldom attributed to jealousy, yet regardless of self-proposed causal theme, partners are violent when delusions are present (Study 13).

6.4 Coping strategies. Participants who are jealous are more likely to have maladaptive methods of harm avoidance (Study 3), are higher in impulsivity (Studies 3 & 14) and are more likely to use tactics such as comfort eating, drinking alcohol, and spending sprees (23.3% v 5.5%) as coping strategies.

6.5 Social behaviours. Jealousy is associated with other types of maladaptive coping behaviour and dysfunctional relationship strategy. There is some evidence those with irrational and excessive jealousy show signs of poorer social adjustment (except for parenting behaviour) (Study 3) and are more likely to use maladaptive relationship strategies such as considering ending relationships, ignoring problems, and discussing with friends/family (24.2% vs 8.3%). They are also more likely to make direct demands

to partners for stronger commitment to the relationship (22% vs 8.3%) (Study 14) and are less likely to try more adaptive strategies such as counselling (only 3.4%).

6.6 Partner-controlling behaviours. Intrusiveness and assault can be thought of as methods of maintaining control over a partner (Study 5). Increasing mental pathology is associated with increased jealousy (Study 11) and increasing checking and monitoring behaviour of the partner (Studies 11 & 12). A re-interpretation of the item data from a large sample community study suggests paranoid ideation might distinguish those who engage in partner-controlling behaviours (Study 9)

Table 5. Other correlates of jealousy that are related to paranoia.

| Study # Authors (Year) | Illicit Drugs | Excess Alcohol consumption | Aggression/ Violence | Low self esteem | Other Mental Health Difficulty | Other |
|--|---------------|----------------------------|----------------------|-----------------|--------------------------------|-------|
| 1. Buunk (1997) | | | X | X | | |
| 2. Carson & Cupach (2000) | | | X | | | |
| 3. Costa et al. (2015) | | | | | | X |
| 4. Crowe et al. (1988) | | | | | X | |
| 5. DiBello et al. (2014) | | X | | | | X |
| 6. Dutton (1994) | X | X | X | | X | |
| 7. Dutton et al. (1996) | | | X | | X | X |
| 9. Lima et al. (2017) | | | | X | X | |
| 10. Marazziti et al. (2010b) | | | | X | | |
| 11. Marazziti et al. (2003a) | | | | | | X |
| 12. Marazziti et al. (2010a) | | | | X | | X |
| 13. Michael et al. (1995) | | X | X | | X | |
| 14. Mullen & Martin (1994) | | X | X | X | X | X |
| 16. Ortigue & Bianchi-Demicheli (2011) | | | X | | | |
| 17. Paolini et al. (2016) | X | X | | X | X | |
| 18. Rodriguez et al. (2015) | | | X | | | |
| 19. Rydell & Bringle (2004) | | | | X | | |
| 20. Silva et al. (1998) | X | X | X | | X | |
| 21. Soyka & Schmidt (2011) | X | X | X | | X | |
| 22. Soyka et al. (1991) | | | | | X | |
| 24. TARRIER et al. (1989) | | | | X | | |
| 25. White (1981) | | | | X | | . |

Discussion

This chapter reviewed factors associated with irrational jealousy in order to establish similarities and differences between paranoia and jealousy, to explore cognitive and affective mechanisms common to both. Furthermore, there is evidence for shared symptoms and symptom patterns that include both phenomena, evidence for a continuum of severity, reality testing problems, cognitive distortions, increased levels of anxiety and emotional regulation problems may contribute to irrational jealousy and provide a link between them. However, research that explores cognition or affect in relation to mild to moderately severe jealousy is very limited, as the majority of jealousy research in relation to delusion (like) phenomena relates to psychiatric case-studies of severe delusion.

A further aim was to determine if there was sufficient evidence to suggest irrational jealousy and paranoid thinking result from a common, latent psychotic process. In summary, there appears to be tentative evidence to suggest a latent psychosis-like process in jealousy, that indeed may underlie both phenomena. Furthermore, both phenomena show considerable overlap in comorbid conditions that might suggest a common origin. However, research in this area is limited to two studies of psychotic processes in jealousy, as except where they relate to severe psychiatric cases this area has received little research attention.

The final aim of the review was to determine if there was sufficient evidence that some jealousy forms might follow similar generative and maintenance processes to those of paranoid thinking (e.g., as detailed by Freeman & Garety, 2004; Freeman, Pugh & Garety., 2008; Gibbs & David, 2003). In summary, there are tentative suggestions that a psychosis-like process may also be involved in jealousy. However, there are only

two studies that explore processes involved in jealousy thought, including cognitive bias, and these are of poor quality, or were not designed as a direct test of cognitive dysfunction which suggests the need for further, high-quality research on generative and maintenance processes in jealousy.

There is substantial variation in how jealousy was operationalised and measured. However, it has usually been treated as a stable personality trait despite strong indications it is a dynamic process. There is an over-reliance on empirical studies rather than theory-driven, hypothesis-based research. Therefore, there are likely to be significant problems with measurement validity. It seems reasonable to conclude, based on the body of evidence, that irrational jealousy has considerable phenomenological and theoretical overlap with paranoia, that there do not appear to be different types of suspicious jealousy, and to tentatively suggest that it results from a latent psychotic process where different but related mechanisms contribute discretely and additively to normal jealousy.

1. Prevalence. There are challenges to establishing the actual prevalence in the population due to problems in identifying psychiatric studies of pathological jealousy. DSM criteria do not classify someone as pathologically jealous unless jealous delusion or ideation is the predominant or only symptom (Silva, Ferrari, Leong, & Penny, 1998), and therefore patients with less severe forms of jealousy, but who still have substantiated irrational thinking, may not have been captured in this review and therefore may be under-reported. However, some indication of the prevalence and existence of less severe forms of irrational jealousy in clinical populations can be gained, as high rates of irrational jealousy were found in patients with psychotic diagnoses, especially schizophrenia (1.3% of all psychosis admissions), 1/5 of whom were aggressive at admission (Studies 21 & 22).

2. Brain Injury/Damage or Toxicity. Consistent with findings for paranoia that suggest differences between delusion and ideation are only quantitative (Bentall, 2009), in the conviction with which an irrational belief is held. This review finds evidence that jealousy differs similarly. As delusional jealousy appears to emerge after several years of suffering from psychosis or as a result of alcohol, substance-use or other toxicity (e.g., alcohol addiction or Parkinson's anti-dopaminergic drug treatment), mechanical trauma or head injury (e.g., stroke). The findings are also consistent with neuropsychological models of delusion (Braun & Suffren, 2011) and suggest severe jealous delusion has organic causes, e.g., brain damage or toxicity. Processes that may account for the apparent increases in severity and transition from ideation to delusions in psychotic states appear to result from damage to brain tissue, brain atrophy (brain damage) or tardive dyskinesia as a result of antipsychotic medication (Moncrieff, 2015). It is possible that in some cases, jealous delusions (but not ideation), are similarly related to drug-toxicity due to drug treatments for psychosis or to changes in neurochemistry related to chronic severe anxiety states. These findings indicate that delusion and ideation have a different and perhaps additive aetiology that results from additional pathology, with difference in jealousy intensity and severity between delusional and other suspicious forms, either arising from separate processes or due to the additional effect of co-morbid conditions.

3. The Role of Substance Abuse. The findings suggest substance abuse has no direct impact upon irrational ideation. The role of alcohol in irrational jealousy suggests alcohol abuse is a risk factor linked to the increasing severity of suspicions, but this mechanism works indirectly. Although drug abuse has been found to increase levels of irrational thinking in cases of paranoia (Freeman, Pugh, & Garety, 2008), the association with irrational jealousy was found only for cannabis and stimulants.

4. Mental illness. This review finds that people with excessive or irrational jealousy appear to be suffering from general mental ill-health. There is substantial evidence corroborated across different methods for two processes or mechanisms related to irrational jealousy. Both increased levels of psychosis and heightened levels of general anxiety or neurosis have the potential to cause at least some forms of irrational jealousy. Although the implicit theory of many studies reviewed is that insecure attachment causes jealousy. Measured attachment anxiety may be an artefact, as measures of insecure attachment are essentially measuring the same phenomenon as measures of anxiety but attributing it to the impact of childhood caregiver relationships and the findings better fit an explanation of general neurosis and anxiety. High levels of emotionality: anxiety/neurosis, were present in all studies of jealousy in community samples, a pattern which continues into both clinical and forensic populations. All studies unanimously found a relationship between irrational jealousy and high anxiety. Those studies that included control groups showed that the highest levels of jealousy were in those with the highest levels of anxiety, who were also more likely to suffer other delusional states (Studies 3, 4, 7, 11, 12 & 16). This finding suggests that like paranoia, heightened affect and level of psychosis have a reciprocal role, whereby increases in either anxiety or psychosis lead to further escalation of both symptoms due to what appears to be a negative feedback loop (Freeman & Garety, 2004); this dynamic appears to exist in both ideational and delusional forms of jealousy.

5. Thematic malleability. Although it appears possible to identify distinct domains of delusional theme (Paolini et al., 2016), most people presenting with delusions have more than one concurrent delusional theme, and themes (e.g., jealous, or persecutory) related to irrational cognition appear to be determined by a person's situational context and not by separate mechanisms for each type of delusion. Jealous

ideation and delusion appear to develop as a focus of psychotic ideation, only within the situational context of having a partner, and in the case of forensic populations, in the presence of prior adverse experiences and trauma. It is not clear whether the link to prior trauma persists in other populations and should be the subject of further study. Only one study related to jealousy-specific cognition was found (Study 5). Therefore, we cannot draw conclusions about any distinctive features in the content of jealous ideation (e.g., rather than other forms of paranoia). Overall, research suggests the process underlying the formation and maintenance of irrational beliefs is similar (Studies 16, 20, 21, & 22) and that theme malleability is determined by differences in social and developmental context (Study 17).

6. Continuum. This review suggests there is evidence to suggest that like that found for paranoia (Claridge, 1972, 1987; Johns & Van Os, 2001), irrational jealousy forms a continuum, from normal (reactive) jealousy and occasional irrational thoughts about their partner's fidelity that most of the population experience (Mullen & Martin, 1994), through ideation to delusional states, with increasing severity and frequency of experience. Increases in either psychosis or neurosis predict increases in both jealousy and ideation across research methods (Studies 4, 11, 12, 14, 24 & 25). Unfortunately, the majority of research reviewed was either normative or clinical and therefore reflects the extremes of any dimension. Findings do however suggest that psychopathological dimensions of jealousy exist within normal populations (Studies 11 & 12) and there is strong evidence (see the subsection – mental ill-health) that affective dimensions related to paranoia (anxiety and depression) are also present in those with irrational jealousy in community populations. Whilst the presence of these phenomena is not sufficient to conclude that there is a latent psychotic dimension, it is indicative of a population continuum. Moreover, that dimensions show a high degree of collinearity also indicates

an underlying second-order factor, such as psychosis (Studies 9 & 12).

7. Cognitive biases/thought disorders/reality testing and belief inflexibility.

Contrary to current aetiological theories of irrational jealousy, which suggest insecure attachment, self-esteem problems, a love-is-blind bias, organic brain changes, Obsessive Compulsive Disorder, Borderline Personality Organisation, or different forms of pathology are responsible for pathological jealousy. The evidence appears more consistent with a view that irrational jealousy results from processes that contribute to the formation of general false beliefs, e.g., cognitive bias, and a lack of reality testing and that these are due to an underlying pattern of clinical and sub-clinical mental ill-health, more specifically, psychosis. The results also indicate that belief inflexibility contributes to jealousy in the general population (Studies 1 & 11). Mental rigidity, inflexibility, and firm conviction to irrational ideas are also related to psychosis and particularly to the maintenance of false belief (Garety et al., 2005). It is possible irrational jealousy arises due to abnormal cognition (e.g., cognitive bias, distorted belief and ideation) and is maintained by belief inflexibility, during subclinical or transient psychotic states. Unfortunately, no studies exist that measures thinking bias, reality testing and thought rigidity across populations, and only few studies measure any one type of thinking error in any population.

Applicability of Findings

There is a knowledge gap concerning more moderate forms of irrational jealousy that appear to exist between normal jealousy and more severe, delusional types. The majority of research reviewed was conducted on normal (reactive) jealousy in community samples, or with severely delusional patients. This review indicates symptoms of sub-clinical irrational jealous ideation associated with problematic jealousy exist, both within clinical populations (where there is no primary diagnosis of

clinical jealousy) and community populations (who are not severe enough to be hospitalised or imprisoned due to the consequences). The number of clinical studies that have been drawn on in this review are few, including only three studies (11, 21 & 22) on populations without brain damage or toxicity. Research focussed on severe delusional forms of mental illness, or conversely, normal jealousy may not generalise to those suffering from sub-clinical or more moderate forms of irrational jealousy. There are further problems with generalisation of clinical studies (e.g., Othello Syndrome or Parkinsonism), to sub-clinical or irrational jealousy that is not the primary mental health diagnosis, as the findings may not generalise to more moderate forms of jealous ideation. Finally, factors contributing to irrational jealousy in one population (i.e., community, clinical or forensic) may not be generalisable to other populations, and there are likely to be multiple aetiologies and causal routes for sufferers of irrational jealousy.

Limitations of the Included Papers

To-date, research has focussed on jealousy's extremes, either normal jealousy or cases of severe delusional jealousy, leaving a gap in the literature and a scarcity of studies of more moderate irrational jealousy across normal, clinical and forensic populations. Furthermore, research in clinical populations has been hindered by restrictive categorisation of delusional conditions, such as paranoia, psychosis, and schizophrenia. The medical profession mostly sees these as discrete disorders, and this has impacted the selection of participant groups for study. Categorisation appears to be far less useful to researchers than clinicians, as these diagnoses tend to describe overlapping symptom patterns that differ only in frequency and severity (Demjaha et al., 2009; Reininghaus, Priebe, & Bentall, 2013). Diagnosis of these illnesses as discrete disorders has meant that much jealousy research has focussed on those with primary

diagnoses of jealousy disorders, thus limiting the understanding of populations where jealousy symptoms are less severe but still an important feature. Therefore, better insight into the continuum of jealous ideation and delusion may be gained if additional research is conducted on dimensions of psychosis related to jealousy across these groups.

Moreover, there appears to be under-reporting for cases of severe jealousy with low referral, hospitalisation and re-hospitalisation rates for jealousy delusions, unless they commit a crime (Gutierrez-Lobos, Schmid-Segal, Bankier, & Walter, 2001). This finding may be due to cultural ideas that normalise jealousy, categorising all but the most severe jealousy as normal. Furthermore, less severe jealousy that nevertheless remains potentially harmful is not distinguished etymologically and there appears to be a lack of acknowledgement that some forms of excessive or irrational jealousy may be indicative of underlying mental ill-health.

Questionnaire research is overused and although it provides valuable data on some aspects of jealous cognition, it does not enable us to infer causal direction and determine whether mental illness, and specifically psychosis, precipitate suspicious jealousy. It also does not enable us to understand whether irrational jealousy might precede mental ill- health, perhaps as the result of alienating potential partners and the diminished social support that would arise. It is also possible that any underlying mechanisms are not easily accessible, and that research has failed to explore any latent dimension effectively.

A significant limitation is the lack of research overtly focussed on cognitive bias in relationship to jealousy. There is no research on well-known cognitive biases in jealousy, with only one poor-quality paper (Swami et al., 2012) addressing a little-

known bias, the ‘love-is-blind’ bias. This limits any conclusion that might be drawn about the role of cognitive bias in jealousy. In particular, the role of confirmation biases, which might illuminate whether, as in paranoia, people suffering from irrational jealousy also tend to infer more strongly than justified from limited information.

Limitations of this Review

One limitation of this review is that the definitions of jealousy used were limited to those related to romantic jealousy. Different conceptualisations of jealousy that include other kinds of familial jealousy, or that relate more closely to developmental approaches, or evolutionary biological imperatives were excluded from this review and this may have led to the exclusion of some papers that might have informed the overall perspective.

Furthermore, the focus of this review on cognition and specifically cognition that is related to paranoia, e.g., cognitive biases, will have led to the exclusion of some papers that may have informed on the wider non-cognitive links between jealousy and paranoia, e.g., emotional deregulation. The constraint of search terms to focus on cognition may have led to the exclusion of papers with findings that were more broadly relevant to the research questions, and that were related to cognition but where cognition was not the primary focus of the research.

Non-English papers were also not included in this review, limiting the ability to thoroughly evaluate findings from other countries that might have informed the research questions had they been included. Given cultural differences in the level of jealousy (Bhugra, 1993; Buunk & Hupka 1987; Canto et al., 2017) and an apparent substantial body of research which has not been translated to English (e.g., Demitaş & Dönmeç, 2006) — particularly from researchers in countries that are perceived to have high

levels of jealousy [e.g., Brazil, Italy, Portugal, and Turkey, (Brase, 2003)] important insights into the role of cognition in jealousy in other cultures may have been omitted from the review. Inclusion of these papers may also have lent transcultural validity to the conceptualisation of jealousy (e.g., led to an understanding of alternative influences upon jealousy and conceptualisations of jealousy in countries where jealousy is understood to be particularly problematic or of particular research interest) and the cross-boundary findings related to paranoid processes in jealousy. Furthermore, the exclusion from this review of non-peer reviewed papers might have led to some publication bias in the findings presented.

Implications and Future Research Directions

This review supports the relationship between irrational jealousy and paranoid ideation and delusion. There is also support for generative and maintaining processes typically found in other forms of ideation (e.g., Freeman & Garety, 2004). However, there is little evidence of causal direction, especially related to the interaction of anxiety, psychotic states and belief inflexibility/rigidity. It remains important to establish if elevated anxiety is present before the onset of jealous ideational states or after. It also remains important to establish any role that belief inflexibility/rigidity has in jealous ideation maintenance. Important methodological limitations preclude any causal inferences from existing research.

This review suggests the utility and appropriateness of exploring irrational jealousy and paranoia's role as a latent psychotic phenomenon in intimate partner aggression and violence (IPV) perpetration, and to further research psychosis as a causal mechanism in IPV perpetration. Substantial evidence suggests both jealousy (Capaldi, Knoble, Shortt, & Kim, 2012; Dobash & Dobash, 1979; Hilberman & Munson, 1978; Makepeace, 1981; Mullen & Martin, 1994; Rounsaville, 1978; Stith, Smith, Penn,

Ward, & Tritt, 2004; Whitehurst, 1971) and paranoia (Capaldi et al., 2012; Stith et al., 2004) are the most robust and strongly correlated psychological variables to IPV perpetration. However, most research to date on IPV perpetration has sought to create risk-profiles of perpetrator characteristics based on personality disorder rather than exploring persistent psychological variables as potential mechanisms.

When a transdiagnostic approach is taken, and single symptoms are desegregated from specific clinical diagnoses, the link between IPV perpetration and mental ill-health points towards a phenomenon that is psychosis-like rather than the result of a specific personality disorder, which is likely to suggest the causal mechanisms are also shared with other types of psychosis-like phenomena. A substantial body of evidence shows that general aggression and violence is related to active psychotic symptoms (Link, Stueve, & Phelan, 1998) and for psychiatric in-patient groups, distinct aspects of paranoia: hostile attribution bias (in ambiguous situations) and personalising bias, and measured violent behaviours (Waldheter, Jones, Johnson, & Penn, 2005) are related. Emotional distress, in particular, anger and anxiety are thought to trigger aggression (Nederlof, Muris, & Hovens, 2014). Aggression in paranoid populations appears to be in response to a perceived threat (McNiel, Eisner, & Binder, 2000; Swanson, Holzer, Ganju, & Jono, 1990).

A focus on how rather than if jealousy and paranoia might be related to IPV suggests the possibility that they are symptomatic of underlying irrational thinking, consistent with the departure from reality associated with psychosis. *Threat/control-override symptoms* (TCO) which are related to paranoia, and the belief that one is being controlled or overridden by forces outside the self, (Link & Stueve, 1994) are hypothesised to be the mechanism that links psychotic states to aggression, with perceived threat the most important component. There is evidence that TCO is also

present in the general, non-clinical population, with psychotic-like experiences and paranoid ideation linked to aggressive responses (Kinoshita et al., 2011; Mojtabai, 2006). However, there is no evidence of TCO symptoms being researched in relation to jealousy or IPV.

This review finds good evidence for jealousy as a paranoid process, and therefore, any psychotic state may interact with emotionality to escalate or exacerbate jealous ideation and symptoms. Thus, it is desirable to explore potentially unconscious influences of anxiety on jealousy and determine if anxiety fluctuations are linked to fluctuations in the level and intensity of jealousy. Findings also support the idea that people suffering from irrational and excessive jealousy frequently use minor evidence to conclude their spouse is untrustworthy, and exploration of whether this bias exists in this population may suggest a mechanism by which this occurs. It seems plausible to anticipate that a jealous partner will display cognitive biases and distortions during partner conflict, where negative emotionality and distress may elevate irrational thoughts. From this review, thirteen research questions for future investigation are apparent (Table 6):

Table 6. Questions for future investigation.

-
1. In what way are jealousy and psychosis related?
 2. Do situational, mental, and affective factors interact to create suspiciousness in jealousy, and how?
 3. Can pathological jealousy, like psychosis, be modelled as a continuum of psychotic thought?
 4. What is the role of cognitive bias and faulty reasoning in jealousy?
 5. Is there any evidence for the existence of specific cognitive or reasoning bias in suspicious jealousy, in particular, the jumping-to-conclusions bias, and how do these differ (or not) to those found in people prone to paranoid ideation?
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6. How do jealous people with reasonable evidence for their suspicions and those who are irrationally suspicious evaluate evidence, particularly in ambiguous social situations?
 7. Do partners in functional relationships display cognitive biases and distortion during conflict that relate to suspicious perceptions of their partner?
 8. What factors distinguish between irrational partner suspicions that are discounted and those that persist?
 9. What is the role of cognitive rigidity in jealousy ideation, what accounts for variability in levels of rigidity, and how do suspicions become rigid?
 10. Are fluctuations in anxiety levels related to the irrationality and intensity of jealous suspicions?
 11. Can it be shown that psychological factors are causal in jealous, suspicious thinking?
 12. Which factors distinguish between those who are irrationally suspicious and those whose partner suspicions are evidence-based?
 13. Do reductions and escalations in the levels of psychosis and other variables related to it (such as sleep pattern and neurosis) lead to concurrent reductions in irrational jealousy?
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Questions 1–5, 7 & 8 are addressed in this thesis. These are more general questions which allow a logical starting point for establishing the basis for more detailed research into specific processes related to delusion-like cognition in jealousy.

It is important to use research designs that enable differentiation between the process and content of jealous reasoning, such as diary studies, video recall, experience sampling, extended observation or experiment. These studies should control for general mental health problems, and in forensic populations for criminality to attempt to determine the unique contribution of psychosis. These can potentially show how process and content unfold over time and infer causality, especially regarding changes in cognition between anxious and non-anxious states. Moreover, designs other than cross-sectional would allow the exploration of causal direction and process in any interactions.

Given jealousy and paranoia are both strongly related to partner aggression (Capaldi et al., 2012; Stith et al., 2004), further comparison studies should explore the boundaries between jealous cognition and affective process in dyadic interaction, in non-abusive, solely jealousy-prone, and partner aggressive groups at varying levels of severity and frequency. Additionally, more detailed research in forensic (specifically Partner Abusive) populations, is needed to explore if patterns of neurosis, psychosis, and thought rigidity found in normal and clinical populations are sustained or elevated in terms of thought persistence and severity in forensic populations.

In the past, pathological jealousy has predominantly been studied in the context of severe mental illness, and furthermore, while trying to explain the relationship to a specific diagnosis, usually of personality or delusional disorder. Recently, several studies have begun to explore jealousy's relationship to paranoia in the general

population; by making an analogy with the study of paranoia, the frequency of suspicious jealousy in the normal population might usefully be determined and any potential relationship with psychosis clarified. These developments and the findings of this review suggest that jealous suspicion should be studied in its own right, by merit of its likely relationship to paranoid thought. Improving understanding of the processes involved has the potential to be translated into improvements in interventions for couples, and individuals with problematic jealousy.

CHAPTER 3. JEALOUSY: AN OVERVIEW AND CRITIQUE OF THEORIES, WITH A FOCUS ON ASPECTS RELATED TO DISTORTED COGNITION

The previous chapter established that jealousy, persecutory thinking and psychosis are not dissimilar phenomena (i.e., they all share the presence of interpersonal suspicious thoughts, intrapersonal ruminative thoughts, and false accusations). In addition, it is suggested that they possess similar aetiological characteristics, mechanisms and physiopathology, and further suggested that they may share a common latent dimension. An increased understanding of the cognitive processes involved may play a vital role in gaining a better understanding of jealousy (Salovey, 1991) and provide insight as to how jealous people come to think and behave towards partners as they do. Through reviewing theories of jealousy, it may be possible to develop a deeper understanding of the relationship between jealousy and paranoia and to provide greater clarity about the underlying aetiology of suspicious jealousy.

Theory shapes research formulation and interpretation, but without adequate empirical substantiation, theory is merely opinion (Wallis, 2010). Theory is particularly important in psychology as there are frequently multiple competing theories, often without clear evidence in favour of one. A good theory should not merely describe a phenomenon but should also attempt to explain what causes said phenomenon. In addition, sufficient detail about the suggested psychological mechanisms and cognitive processes responsible for a phenomenon should be provided in order to explain variations within the particular phenomenon. With reference to the topic of jealousy, it is suggested that a good theory in this area should provide a comprehensive map of components of jealousy (i.e., descriptions), provide detail regarding the organisation of potential causal factors (i.e., the temporal and spatial order of such factors), and detail

regarding contexts in which acts of jealousy occur (i.e., responses to different environmental inputs). Finally, theory should provide a suggested explanation as to how the various issues associated with jealousy (e.g., suspiciousness and invasive behaviours) arise, are maintained, and interact with each other to produce behaviours associated with jealousy. Such detail is necessary where theories are used as the basis of intervention development.

This chapter reviews, evaluates, and synthesises theories of jealousy. Limitations of the theories are discussed, and attempts are made to answer the questions posed in this thesis (i.e., might suspicious thinking in jealousy and paranoia be linked, and if so, how?). This review includes all widely used theories of jealousy, and, whilst some inclusion is made of the broader theoretical field, this is only where broader theories provide sufficient depth regarding explanations of jealous cognition, detail of the form and structure of jealousy, and/or provide explanations for a potential link between jealousy and psychosis. Theories are sought that, it is felt, best explain the causes of both rational and irrational jealousy, and the presence of comorbid psychotic states and irrational thinking (outlined in the previous chapter). The aim is to firstly provide the reader with an understanding of the phenomenon of jealousy based on a review of theory and to explain the empirically observed similarities between jealousy and paranoia/psychosis (described in the systematic review chapter). A secondary aim is to explore the full spectrum of jealousy related issues. Theories included in the following review have been developed from research with ‘normal’, clinical, and forensic populations.

How has Jealousy been Categorised?

Whilst jealousy is often accepted within society as normative, theories suggest

that there are forms of jealousy that are less functional and more pathological. Romantic jealousy is assumed to occur when a real or imagined rival threatens a romantic relationship (Pines, 1992). In community studies it has been found that the experience of jealousy is nearly universal (Mullen & Martin, 1994), so it may be assumed that jealousy is a very common, and therefore normal experience. Dysfunctional forms have been identified such as Othello syndrome, conjugal paranoia, suspicious jealousy (e.g., Salovey, 1991), pathological jealousy (e.g., Mullen & Maack, 1985), abnormal and neurotic jealousy (e.g., Freud, 1921), irrational jealousy (e.g., Ellis, 1977), unprovoked jealousy (Hoaken, 1976), morbid jealousy (e.g., Kingham & Harvey, 2004), and cognitive or behavioural jealousy (e.g., Pfeiffer & Wong, 1989), but it is not clear whether any of these forms relate to distinct types or they are different terms that relate to a dysfunctional type of jealousy. Furthermore, the consequence of the subtyping, of what appear to be similar or equivalent forms, is that within psychological research they have often been treated as distinct subtypes according to which psychiatric diagnosis they most resemble (e.g., see Mathes & Severa, 1981; Sharpsteen, 1991; White, 1981).

Research with large psychiatric cohorts suggests that problematic (and therefore, by definition, pathological) jealousy is present in many psychotic diagnoses (Soyka et al., 1991; Soyka, 1995). However, pathological jealousy is classified by the DSM-5 (APA, 2013) rather narrowly as (a) obsessive jealousy, a “specified related disorder” of another compulsive-obsessive disorder; and (b) jealousy-type within the delusional disorder. It is suggested that as selection of participants for research often relies on their belonging to a particular diagnostic category, this narrow definition may have led to the majority of research on pathological jealousy having excluded many participants from studies for whom jealousy is not the primary diagnosis as they are outside the scope for

selection, thus diverting possible explanations that explore common symptoms rather than diagnoses (Soyka, 1991; 1995).

In addition to the issues surrounding the selection of participants for research, authors' failure to distinguish between different kinds of jealousy makes it difficult to determine whether theories are making reference to normal jealousy, dysfunctional jealousy, or both. Jealousy has been studied within the fields of psychiatry and psychology, however there is a dearth of cross-disciplinary research and the different fields differ in definitions used and focus of study. The apparent consequences of this are that some authors (e.g., White & Mullen, 1989) identify a form of normal jealousy whereas others appear to consider all jealousy dysfunctional or abnormal; it is unclear as to whether researchers and theoreticians are referring to the same phenomenon when discussing jealousy. In addition, clinical/psychiatric definitions are often applied inappropriately to research within community populations where the phenomenon described appears qualitatively different (White & Mullen, 1989).

A further problem with creating theoretical clarity is presented when trying to distinguish between different forms of jealousy. There have been a number of attempts to categorise types of jealousy in order to distinguish between normal and dysfunctional types. Salovey (1991) makes the distinction between jealousy in response to a real event (i.e., where a partner has definitely committed a transgression with another individual) and suspicious jealousy (i.e., in response to imagined events). Similarly, Ellis (1977) distinguishes between rational and irrational jealousy. He argues that rational jealousy is a response to a concrete threat with a high probability that an individual would lose their partner, whereas irrational jealousy is based on dogmatic, unfounded, absolutist beliefs.

Additionally, boundaries between what is accepted as normal and pathological jealousy depend very much upon the prevailing culture and the socially accepted norms within that culture. Furthermore, norms have been found to change over time; for example, a century ago in the UK, acting in a jealous manner was considered to be socially acceptable, whereas nowadays, jealousy is perceived as an unhealthy and potentially pathological emotion (Mullen & Martin, 1994). Research has found that some Samoan cultures appear to be devoid of what we would consider jealousy (Mead, 1977, as cited in Buunk, 1997).

In reviewing descriptive theories of jealousy, it appears that there is overlap between definitions of abnormal types of jealousy but that normal and dysfunctional jealousy appear to be qualitatively distinct from each other. It has been said that the boundary between “normal” and “pathological” jealousy is difficult to define (Mullen, 1991). It seems plausible that this is due to typological conceptualisations of irrational jealousy not fitting well with what is known about jealousy, and that a theoretical conceptualisation of jealousy on a continuum of severity might have greater validity.

According to Theory, What Causes Jealousy?

The following section reviews explanations as to how jealousy arises, how it is maintained, and how different behavioural outcomes occur. For clarity in understanding the mechanisms proposed by each theory, theories are organised into biological, individual, developmental, and situational strands (Ward & Seigert, 2008). Two evaluative tools are utilised in the following sections in order to assess the adequacy of a theory with reference to the theory’s ability to explain the nature and aetiology of jealousy. The first of these two tools was developed by Bradford Hill (1965) who suggested a number of well-established criteria (Table 7) to evidence a causal

relationship between a presumed cause and an observed effect.

Table 7. Bradford Hill criteria for assessment of causal effect.

The first five criteria relate to empirical aspects of causality

Strength of association (i.e., effect size).

Consistency (reproducibility): it summarises the body of evidence over different observers, samples and places.

Specificity: other potential explanations are eliminated, and the population, site and disease are clear.

Temporality: the cause should temporally precede the effect.

Biological gradient: greater exposure should lead to a higher level or incidence.

The final four criteria relate to theory:

Plausibility: the mechanism should be plausible in terms of cause and effect.

Coherence: the laboratory and empirical findings should be coherent.

Experimental evidence.

Analogy: to explore similar factors.

By applying these criteria to the body of theory on the topic of jealousy, it should be possible to identify what can be reasonably known and highlight where additional development is needed. Whilst details of a causal chain are difficult to obtain in psychology, each cause must occur via a mechanism or mechanisms. Without sufficient detail of the mechanism and a clear causal chain, a proposed link between cause and effect may just be the result of feasible but faulty sense-making (Bradford

Hill, 1965). The second tool was developed by Bechtel (2008) who summarises the importance of mapping entities (elements) to activities (processes) in mechanism discovery, pointing out that it is often this mapping that allows us to identify the working parts of a mechanism. This tool allows us to evaluate the proposed mechanisms put forward within a theory, thus guiding future research by both helping to clarify how transparent a theory is regarding proposed mechanisms, and by highlighting gaps in their logic.

1. Early psychiatric explanations.

Historically, jealousy was considered a type of paranoia and its cause attributed to psychodynamic or biological processes. It has been viewed as: a narcissistic wound, prioritising self-love over love of the other (Freud, 1925); a symptom of dementia praecox (Kraepelin, 1910); and as organic degeneration or a development of an underlying suspicious personality trait (Jaspers, 1910). The field of psychiatry has sought to establish a potential link between paranoia and jealousy and data supports the relationship between organic degeneration and jealousy in some cases. However, early psychiatric explanations have a number of potential weaknesses. Firstly, explanations of jealousy as a form of paranoia or psychosis are based on case studies of a distinct subgroup of clinical patients, with severely disorganised personalities, who suffer from rare delusional forms of jealousy (e.g., Brunswick, 1929; Curling et al., 2018; Shingo et al., 2013). Furthermore, despite frequent testing, there is a lack of empirical support for psychoanalytic (e.g., Freud, 1922/1940) notions that jealousy is based in childhood sibling rivalry, harsh discipline, attachment difficulties and parental conflict (Clanton & Kosins, 1991). Overall, there is little support for early theories of jealousy beyond the general suggestion of links to psychosis and organic damage.

2. Biological explanations.

2.1 Jealousy delusions are the result of toxicity and brain damage.

Structural alterations of the right hemisphere have been found to increase the incidence of severe jealousy diagnosis (Ortigue & Bianchi-Demichelli, 2011). Brain lesions (specifically right frontal lobe damage, stroke, brain injury, disorder or disease affecting the right brain stem) have been found to lead to severe forms of jealousy (Ortigue & Bianchi-Demichelli, 2011). Damage to brain regions (i.e., the right hemisphere and emotion centres) have been related to false belief psychological systems and appear to be responsible for increased levels of suspicious jealousy (Marazitti et al., 2003). In addition, there is evidence linking delusions in Othello syndrome and severe and delusional jealousy with underlying organic/toxic conditions. For example, dopamine agonist treatment for Parkinsonism has been linked to delusional jealousy (Georgiev et al., 2010; Poletti et al., 2012), as have alcohol side-effects or toxicity (Michael, Mirza, Mirza, Babu, & Vithayathil, 1995a; Shrestha, Rees, Rix, Hore, & Faragher, 1985). Furthermore, alcohol toxicity is associated with severe jealousy in community (de Bello et al., 2014; Mullen & Martin, 1994) and clinical populations (Michael et al., 1995; Silva et al., 1998). In each of these cases, toxicity occurs prior to the severe or delusional condition and ceases when the drug is removed (in the case of drugs to treat Parkinsonism). Given that the results of these combined individual studies and Ortigue and Bianchi-Demicelli's (2011) review show that delusional jealousy results from brain damage to specified areas and also toxicity, and that these studies taken as a whole have a clear baseline (reports before injury or toxicity), the finding is replicated multiple times, across multiple sites, using designs capable of examining cause and effect, and the data is publicly available for independent analysis (a

requirement of NIH grants), there is good evidence to conclude that severe delusional jealousy can be as a result of underlying organic mechanisms. However, there is insufficient evidence that organic explanations extrapolate to jealous ideation, which may be caused via a different mechanism or mechanisms.

3. Evolutionary biology.

3.1 Jealousy arises in order to ensure paternity or economic resources.

Arguably, the most influential theory of jealousy, with over five times more publications than any other jealousy theory, has been the *Innate modular hypothesis* (IMH; e.g., Buss et al., 1992). This theory attributes jealousy to an evolutionary mechanism: mate guarding behaviour, which is proposed to be a natural response to mate rivalry designed to ensure and protect the male's paternity of any child (Buss, 1988). The IMH claims that the function of jealousy is to ensure that a couple stays together long enough to ensure the survival of their genetic offspring. Buss et al.'s theory predicts that each gender will differ in terms of the situations that evoke jealousy; women become jealous when their partner has a potential emotional connection to a rival (which would constitute a threat to their mate's continued care of the family) and males become jealous when there is the potential of a sexual connection to a rival (as it is then more difficult for the male to be certain they are the father of a child).

The IMH appears to offer both a clear mechanism and a well-substantiated functional explanation for normal jealousy. However, whilst the IMH might explain normal jealousy as mate-guarding, the evidence for differences between genders is inconclusive (see Fredrick & Fales, 2014; Kato, 2017). Furthermore, whilst there is agreement between genders on what constitutes sexual infidelity, this is not so for

emotional infidelity and it appears female definitions of emotional infidelity constitute a more permanent threat to the relationship (Guitar et al., 2017). The IMH also has no explanation for irrational jealousy, or escalation of jealousy, other than increased environmental threat (increased rival attention). Furthermore, the IMH erroneously predicts that jealous responses (e.g., hostility and aggression) would always be directed towards a rival; however, evidence suggests that most hostility and aggression is directed toward the mate rather than a rival (e.g., Foss & Galloway, 1993). This omission by the IMH is of interest; attacking the mate does not appear to offer an evolutionary advantage in the way that attacking a rival would, although attacking a mate may make it more likely that they will remain faithful due to fear. In the longer term, attacking one's mate is likely to result in their termination of the relationship (Ahmadabadi et al., 2018). Furthermore, jealous attacks are suggested as a leading cause of many mate homicides (Mužinić et al., 2003), and both outcomes are likely to result in any offspring's failure to thrive (White & Mullen, 1989). So, whilst this theory provides a functional explanation for normal jealousy, despite substantial testing the authors' claims about gender differences remain unsubstantiated and the theory fails to provide an explanation for suspicious forms of jealousy.

4. Developmental Explanations

4.1 Jealousy results from insecure attachment to a primary caregiver or from sibling rivalry. Feelings of anxiety that result in suspicions about partner infidelity has been proposed to be as a result of adult insecure attachment arising from insecure childhood attachment (Hart, 2013) in normal (Costa, Sophia, Sanches, Tavares, & Zilberman, 2015), clinical, and forensic populations (Dutton, van Ginkel, & Landolt, 1996). The notion that insecure attachment is a cause of jealousy lacks a robust

evidence base and it is proposed that no association exists at all between the two issues (Clanton & Kosins, 1991; Kosins, 1984). When neuroticism and social anxiety are statistically controlled for, the full effect of attachment is accounted for (Buunk, 1997).

Adult insecure attachment findings in studies of jealousy may be a measurement artefact or tautological description of general anxiety or neurosis, and it seems more likely that neurosis (rather than attachment insecurity) is related to jealousy. An alternative developmental explanation is that jealousy results from childhood sibling rivalry (Buunk, 1997). Hart (2013) suggests that adult partner jealousy develops in a number of stages over the course of growing up, and that romantic jealousy is a combination of biological imperative (see Buss, IMH) and a '*sensitive predisposition*' to rivalry for attention and love from the mother. However, there is no evidence to support the notion that sibling rivalry contributes to later jealousy (Clanton & Kosins, 1991; Kosins, 1984). Furthermore, the longitudinal cohort research necessary to support this view has not been conducted.

5. Personality.

5.1 Jealousy develops as the result of general insecurity, sensitivity and negativity.

DeSteno (2006) proposes that jealousy arises as a response when an individual's self-esteem or self-concept is threatened as a result of comparing themselves to the rival (DeSteno & Salovey, 1994). Other dispositional mechanisms suggested to increase jealousy are: a less benevolent attitude to the world (White, 1984), lower life satisfaction (Manges & Evenbeck, 1980), more external locus of control (Jaremko & Lindsey, 1979), and easy arousal (Bringle & Williams, 1979), or a greater sensitivity to threatening environmental stimuli (Bringle, 1981). With the exceptions of low self-

esteem (see Chapter 2) and threat sensitivity (Bringle, Renner, Terry, & Davis, 1983; Cohen et al., 2014; Rydell et al., 2004), there is no empirical evidence for other dispositional causes. Although it is plausible that jealousy could develop as a result of low self-esteem, research on the relationship between self-esteem and jealousy is correlational and, as such, low self-esteem has not been verified as a cause of jealousy.

5.2 Jealousy is the result of specific psychiatric disorders.

Some theories suggest that jealousy results from a number of psychiatric disorders and, where an individual has no psychiatric diagnosis, it has been suggested that jealousy results from attenuated versions of these disorders that are expressed as personality traits). In particular, links have been found between jealousy and obsessive-compulsive disorder (OCD) (Cobb & Marks, 1979; Ecker, 2012; Marazziti et al., 2003a), borderline personality organisation and disorder (Dutton, 1994; Dutton et al., 1996), and paranoia (Pines & Friedman, 1998; Tarrier, Beckett, Harwood, & Bishay, 1990). Marazitti et al. (2010) proposed a model of pathological jealousy on the basis of four hypothesised underlying diagnostic dimensions: depressive; insecure attachment; obsession; and paranoia. However, the evidence for these dimensions (Lima et al., 2017; Marizitti et al., 2010) suggests that these dimensions are unstable, with named categories which do not reflect the included items. There is evidence that jealousy might be on a spectrum that spans personality traits and mental ill-health symptoms, although the patterns observed in the work by Lima et al. (2017) point to a mixture of dimensional intensities and categorical qualities (distressed affect, thought disorder, hostility) that are contributory factors with a hierarchical organisation; this structure will be explored further in Chapters 4 and 5.

6. Situational context.

6.1 Jealousy intensity is due to perceived relationship commitment.

Knobloch and Solomon's (2004) *Relational Turbulence Model* suggests that jealousy arises due to relational uncertainty. The theory appears to be based on attachment theories in that it suggests levels of jealousy differ according to the stage of a relationship (i.e., level of attachment) and according to the degree of commitment reflected by relationship stage). In particular, relational turbulence theory suggests that people make three primary appraisals in response to a perceived relationship threat: (1) the potential for a rival relationship to develop; (2) the likelihood that the rival relationship actually exists; and (3) the degree of harm posed by the potential or actual rival relationship. In addition to the apparent plausibility of this argument, findings of longitudinal research studies provide support for this theory, i.e., research shows that relational uncertainty is positively correlated with jealousy (Theiss & Solomon, 2006).

6.2 The impact of cultural and situational factors on jealousy.

Bryson et al. (1984) suggest that relationship investment, prior relationship satisfaction, the quality of alternative partners, gender, and ambiguity of the situation determine responses to jealousy provoking situations. Bryson et al. (1984) further assert that responses are a synthesis of unspecified individual characteristics and cultural norms regarding the expression of jealousy. A potential weakness of this explanation is that it is strongly reliant on contextual factors as opposed to individual level factors. For example, it suggests that suspiciousness is a function of the environment but fails to specify any mechanism by which this happens and furthermore does not explain how variations in the intensity of suspiciousness result from the particular environment. Hupka (1991) also proposes that culture influences the way in which people perceive

and respond to stimuli which could trigger feelings of jealousy, by shaping cultural norms for when it is appropriate to be jealous and the appropriate response to this. He suggests that individuals are more likely to feel threatened within a relationship in societies where: property ownership is important; people need descendants in order to ensure wellbeing in old age; marriage is required for socially appropriate sex; and adults require a mate both for economic survival and social status. He gives examples of cultures in which there is seemingly no jealousy and where the norms of 'being respected' result in culturally sanctioned appropriate behaviour. He also highlights that there are culturally appropriate behaviours for each gender. For example, in Apache culture it was appropriate for a male to kill a male rival, but a woman would only be able to publicly berate her husband. He purports that other factors also influence jealousy —culture being just one factor amongst many. A weakness of this view is it fails to detail individual variation within a culture or give any explanation as to how suspicious jealousy develops in an individual.

7. Cognitive and Integrated Theories.

Four theories that attempt to explain proximal and situational factors are outlined and critiqued below. The final two explanations include a multidimensional analysis (which provides detailed processes and mechanisms of jealousy), and in addition, include potential aetiologies of jealousy and explanations of differences between normal and suspicious jealousy.

7.1 Jealousy occurs due to perceived inequality in the relationship

Buunk's exchange theory of jealousy (1991) claims that jealousy arises from a person's relative satisfaction with their relationship which, in turn, is based on their appraisal of the romantic relationship's qualities. In particular, the theory suggests that

an individual will evaluate the fairness and equality of their relationship and consider the cost of the potential loss of the relationship. Their appraisal also informs their choice of conflict strategy (e.g., aggression, problem-solving etc.), and is further determined by the relative priority given to their own and the partner's priorities (Kelley, 1979). It is suggested that jealousy results from perceived relative equality and perceived likelihood of the relationship continuing. The balance of dependency within the romantic relationship will impact on jealousy in that the less dependent partner will have more power in the relationship and is therefore less likely to be jealous than the more dependent one.

Buunk (1988) distinguishes between three forms of jealousy: *reactive jealousy* due to a partner's real involvement with another; *preventative jealousy*, which is not a response to an actual event and even minor signs of attraction to another are interpreted as threats and will result in behaviours designed to control the partner; and *self-generated jealousy* which, like reactive jealousy, evokes an emotional response, but is due to imagining the partner in jealousy provoking situations and results in anxiety and worry. *Self-generated jealousy* differs from preventative jealousy in that it does not involve controlling behaviours. Buunk's (1991) suggested mechanism aims to explain behavioural strategies but does not explain increased sensitivity to minor relationship threats. His claims that preventative jealousy is difficult to distinguish from reactive jealousy are not supported by research. In addition, there is no research on variation in jealousy type due to felt or expressed emotion. Furthermore, there is no evidence that preventative jealousy is due to anxiety, or indeed that it determines whether other types of jealousy involve anxiety as part of the motivation for controlling behaviours. The only evidence for the typology is that dependency increases both frequency and severity

in reactive jealousy (Barelds & Barelds-Dijkstra, 2007).

7.2 Process theories.

The following three theories are based on *Lazarus and Folkman's cognitive-transactional theory of stress, coping and emotion* (1984). The theory suggests that individuals appraise their environment to determine whether stimuli add to their wellbeing or are benign. If a threat is detected, then an individual will conduct a secondary appraisal to find a coping strategy. The effectiveness of the enacted coping strategies is then assessed, creating an ongoing feedback loop.

7.2.1 Jealousy results from poor mental health, relationship dependency, perceived lack of alternatives, sex-role traditionalism and the appraisal of threat.

Mathes' cognitive theory of jealousy (1991) considers jealousy to be a universal response to a relationship-threatening situation and does not pathologise all forms of jealousy. In short, he suggests that jealousy results from relationship dependency, a perceived lack of alternatives and sex-role traditionalism. The perceived threat of losing relationship rewards and a reduction in self-esteem is dependent on the value placed on a relationship by the individual, the perceived probability that the rival will take the partner, and the extent to which the individual values monogamy. Mathes (1991) suggests that an individual's psychological health and level of trait jealousy will influence the level of threat that is perceived by them, with a high level of trait jealousy leading to greater stress. If the situation is thought to pose a threat during the primary appraisal process, then the person will experience feelings of jealousy. A secondary appraisal then takes place during which the individual considers ways in which the situation could be remedied. Coping strategies suggested within the theory include increasing rewards to the partner, punishing the partner, or using moral and legal power

over them. Mathes (1991) purports that both normal and irrational jealousy arise due to specific mental health and personality characteristics that influence both the appraisal of the situation and the choice of coping strategy. In contrast to many theories of jealousy, Mathes' theory describes a number of apparently testable, cognitive processes involved in jealousy (specifically primary appraisal, secondary appraisal, and escalation or de-escalation of emotional or behavioural responses based on feedback about coping strategy effectiveness), and that these behavioural responses are used as a form of anxiety reduction, and are potentially testable within the context of a research design that uses repeated measures to record thoughts, emotions and behaviours. Results of such studies could add support for Mathes' theory.

However, despite his proposal within the theory that jealousy is a personality trait, there is a lack of support for this within the wider literature. For example, if jealousy were a trait then it should appear as a discrete factor in the well substantiated Big Five personality trait model (Costa & McCrea, 1992; Digman, 1990) or the 16PF (Cattell et al., 1970). As such, it is suggested that jealousy is more likely to be a product of other dimensions of personality such as anxiety/neuroticism. Furthermore, the theory does not explain why an individual may experience more or less jealousy at particular times in their lives, and how mental health issues might impact jealousy. There are a number of kinds of poor mental health and mental health is not constant across an individual's lifetime (e.g., Kurtz, 2005; Westerhof & Keyes, 2010). The lack of specificity in relating poor mental health in general to increased jealous pathology is not helpful in identifying exactly which aspects of poor mental health are problematic or causal in relation to jealousy. Therefore, the theory needs to detail which aspects of mental health are relevant to jealousy and when these aspects might impact on a

relationship. To date, theory lacks detail regarding how poor mental health and/or trait jealousy may lead to an acute jealousy episode, or how or which mental health issues may link to which affective, cognitive or behavioural jealousy outcomes. Only one research study appears to have investigated the link between mental ill-health and personality traits by measuring neuroticism, introversion/extroversion and dependency using a number of measures — only one of which was clinically robust. Of the numerous proposed relationships within the model, it generated evidence for a link between jealousy and the personality trait of neuroticism (Mathes, Roter, & Joerger, 1982). In turn, neuroticism has been found to be associated with a range of mental disorders (Ormel et al., 2013; Tyrer, Casey & Gall, 1983). However, it is of note that the study adopted a cross-sectional design and as such, it is not possible to ascertain the direction of association between the neuroticism and jealousy.

7.2.2. Jealousy results from social and cultural expectations, personal threat sensitivity, coping strategy choice, and the ability to test reality.

White and Mullen's (1989) Process-orientated model of romantic jealousy suggests that variation in people's ability to 'reality test' leads to variation in levels of romantic jealousy; this issue is therefore instrumental in whether an individual displays rational or pathological forms of jealousy (White & Mullen, 1989). The model integrates a number of theories (e.g., Hupka, 1991; Lazarus & Folkman, 1984) and suggests that jealousy is a complex, involving emotion. In addition, the model highlights that cognitive processes and subsequent behaviour are not unidimensional — i.e., there are many factors that need to be considered. Within the model, jealousy is seen as interactional and systemic. Rather than being deemed a discrete entity or trait, the model proposes that jealousy arises as a result of specific interactions within a romantic relationship and the individuals who are in that relationship, and highlights the

impact of social and cultural factors as well as patterns of thought, emotion, and behaviour/s.

Jealousy is said to result from primary appraisal of a threat to the continuation of the relationship or to a person's self-concept due to a relationship threat. This primary appraisal is followed by a secondary appraisal whereby an individual will consider an appropriate coping strategy, and finally, will implement the coping strategy.

White and Mullen's (1989) model suggests there to be multiple jealousy patterns with multiple associated aetiologies that result in different patterns of emotion, thought, and behaviour. They suggest that isolating each individual mechanism or symptom is a useful way to proceed with further research. They propose that advances in understanding are best made by identifying relatively stable, causal factors in the relationship, personality, or culture, rather than treating jealousy as a personality characteristic. Whilst White and Mullen's model integrates a number of prior theories and research findings into a coherent, multifactorial explanatory model, it remains only an associative model, based on hypothesised causal relationships. It remains largely untested and, where studies have been conducted, it is questionable whether the research designs are suited to the exploration processes, interactions and transactions over time, and have been cross-sectional (Buunk, 1997; Rydell et al., 2004). Furthermore, mechanisms that cause differences in reality-testing capacity and threat sensitivity could benefit from a more detailed explanation of these and the model has not led to research into whether these differences exist or what might cause them (see Chapter 2).

7.2.3. Jealousy is due to the individual's sociocultural history.

Bringle's (1991) transactional model combines multiple factors related to jealousy. Bringle (1991) assumes that jealousy originates in an individual's sociocultural history and that no *a priori* circumstances evoke jealousy. It suggests that both the person and the situation contribute to jealousy in varying degrees. Any event thought to have the potential to cause the loss of the desired relationship will be responded to with jealousy, i.e., jealousy does not only occur where the person perceives a loss of a romantic partner to a rival. The model suggests that *commitment, insecurity and arousability* (described in Table 8) must be present for a jealous response, and that increased levels of each increase the intensity of the jealous response.

Table 8. Outline of factors that must be present for a jealous response.

Commitment comes from the individual's appraisal of the relationship, i.e., a perceived decline in the partner's commitment will lead to insecurity. **Insecurity** is based on the appraisal of the partner's commitment to the relationship and is influenced by the difficulty of accurately determining the partner's actual commitment to a relationship.

According to the model, **insecurity** is due to:

- 1. Predisposing and background factors:** i.e., factors that generate uncertainty about the partner's relationship intentions, for example, low self-esteem, or low partner commitment to the relationship.
- 2. A shift in partner commitment:** i.e., whereby an individual believes that their partner's priorities have changed from being concerned with joint goals to being more individualistic (Kelley, 1979; Pruitt, 1981).
- 3. Jealousy evoking events:** i.e., acute events that signal a reduction in the partner's commitment to the relationship and a perceived loss of relationship stability and positive outcomes (Plutchik, 1980).

Lastly, **arousability** refers to the apparent reciprocal relationship between prior events and generated emotions; this reciprocal relationship escalates the experienced emotional state (jealousy) and related cognitions (Bringle, 1998).

The model suggest that *commitment, arousability and insecurity* all evolve from: (1) the *person's* trait and situational aspects; (2) the *relationship's* stable and transient states (e.g., the couple's history, and whether they have just had an argument); and (3) the *situation* (i.e., current social circumstances influencing the individual). In addition,

appraisal of the relationship's past rewards, and of the effect of the partner's extradyadic behaviour on future outcomes, is influenced by personal, relational, and situational factors.

What differentiates between normal and suspicious jealousy?

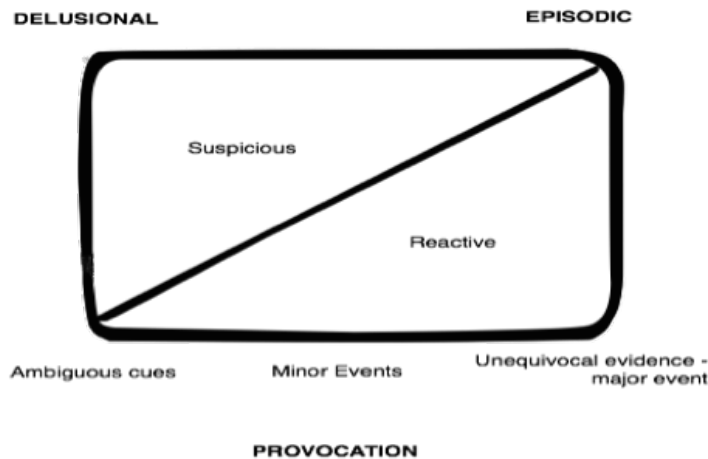


Figure 2. Bringle's categorisation of jealousy types.

Bringle (1991) splits jealousy into normal and suspicious types (*see Figure 2*). Normal 'reactive' jealousy is thought to be largely rational, as it is based on substantiated evidence of the partner's extradyadic involvement. Other researchers suggest that suspicious jealousy is not delusional where the partner is, in fact, unfaithful. Bringle (1991) argues that even when the partner is unfaithful, this does not mean that the suspicious partner is not delusional, i.e., partner infidelity and delusional thought are not mutually exclusive. He suggests that suspicious jealousy is, by nature, delusional, and outlines what contributes to this process (*see Table 9*). He further suggests that problems differentiating between the credibility of evidence for partner infidelity arise when moderate circumstances and minor events are taken as sufficient evidence of actual infidelity, i.e., it is due to a difficulty in determining where concerns

are justified when evidence is ambiguous and in responding to minor cues as though they were substantive evidence of their partner's actual or intended infidelity.

Table 9. Components of suspicious jealousy (Bingle, 1991).

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1. Excessive anxiety and worry, disproportionate to the exogenous evidence, where the content concerns what the partner might have done or is intending to do.
 2. Excessive mistrust of the partner.
 3. Regular snooping and checking on the partner and attempts to control their behaviour.
 4. Personality variables (described later in this section) and, to some extent, chronic relationship variables that lead to consistently high levels of dispositional insecurity.
 5. High levels of emotional response to relatively minor jealousy-evoking cues, in the absence of any major jealousy-evoking cues.
-

How does Bringle suggest each form might arise?

Dispositional jealousy is thought to arise within the parent-child relationship and is thought to be associated with other personality traits of both the parent and the child (Bringle & Williams, 1979). It is suggested that vulnerability to suspicious jealousy results from a combination of high emotional-reactivity and cognitive and behavioural 'coping strategies' (Bringle & Buunk, 1985) related to heightened vigilance, agitation, mistrust, worrying and excessively emotional responding (Bringle, 1991).

Bringle (1991) suggests, based on work by Beck (1976) and Larsen, Diener, and Cropanzano (1987), that there are three specific chronic personality traits related to suspicious jealousy:

1. Self-referencing of ambiguous cues.

2. Selective abstraction (i.e., focus on the emotion-provoking aspects of an event).
3. The overgeneralisation of isolated events to constitute evidence of a more comprehensive but hidden set of relationship threatening events.

In reactive jealousy, priority is given to exogenous (i.e., relationship and situational) factors (see Figure 2), whereas in suspicious jealousy, evidence based on endogenous (i.e., personal) factors is prioritised by the individual, with irrational thinking arising from the elaboration of minor cues believed to confirm suspicions that relatively minor events constitute a significant threat. Suspicions are resistant to change, and partners' declarations of commitment to the current relationship or lack of evidence for extra-relational involvement do not appease mistrust or excessive vigilance.

Bringle's model integrates both distal and proximal risk factors into a plausible, multifactorial explanation that includes a number of personality and sociocultural influences which impact upon the intensity and rationality of jealousy. It suggests there are a number of thought processes that contribute to jealousy that go beyond the more usual general discussion of personality variables and emotional responses highlighted in other theories and models; as such, it is better able to differentiate between normal and irrational jealousy. A significant strength of the model is that it goes beyond merely describing jealousy in that it suggests a number of specific, testable mechanisms that differentiate between reactive and irrational types of jealousy (i.e., the relative prioritisation of endogenous or exogenous factors, and specific cognitive biases and processes through which suspicious jealousy might arise and be maintained).

However, a limitation of the model is that it does not integrate well-established biological contributions to underlying vulnerabilities to suspicious jealousy.

Furthermore, there are potential issues with some of the variables specified in the

model. For example, what Bringle (1991) identifies as chronic personality traits (e.g., self-referencing), could be better characterised as transient states or cognitive processes. In addition, *arousability* appears to be dispositional and not specific to jealousy. Furthermore, the model fails to specify which emotion is subject to high levels of emotional response relating to increased jealousy. It is therefore unclear how high levels of emotional response is distinct from emotional reactivity. Bringle also does not specify how factors interact; in particular there is insufficient detail about how affective and cognitive factors interact to produce behavioural outcomes (e.g., how vulnerabilities such as excessive anxiety interact with more proximal factors such as current irrational thinking to produce a particular outcome). Additionally, the model fails to suggest a clear mechanism for irrational jealousy maintenance, suggesting simply that this type of thinking is resistant to change but failing to explain why or how this might be so. Lastly, despite the theory's potential and its testable hypotheses, unfortunately Bringle's model has not been the basis of much research. Therefore, whilst individual influences on jealousy included in the model are substantiated by correlational evidence, there is a lack of evidence for the suggested processes/mechanisms, and no studies exist that explore the suggested developmental factors, cognitive biases, reality testing deficits, or relative importance of endogenous or exogenous factors.

For clarity, *Table 10* provides an evaluative summary of the theories include

Table 10. Summary and comparison of jealousy theories.

| Theory | Theoretical Background | Quality of Evidence | Theoretical Quality | | | | Scope and Causal Mechanism/s | Weaknesses general/in relationship to thesis question |
|---|--|---|---|--|---|---|---|---|
| | | Consistency, Specificity, Temporality | Plausibility | Coherence | Evidence | Components | Processes/ mechanisms | |
| Biological Toxicity and Brain Damage | Biological Physiology | Excellent – consistent, specific regions effected, cause before effect. Delusional changes not jealousy specific. | Very plausible link to all types of severe delusions regardless of content. | High levels of coherence | Extensive testing, excellent evidence for severe delusional forms | Multiple types of severe delusion related to toxicity and brain damage. Related to other forms of delusion in form. | Chemical or mechanical damage to specific brain areas alters thought, mood, behaviour. | Difficult to explain jealousy content. Failure to specific pathways for interactions between emotions, thoughts and behaviours. |
| Buss IMH | Evolutionary Biology | Good evidence – biological component Weak evidence – gender differences | Plausible for normal jealousy; falsely predicts aggression towards rival/not mate | Mixed evidence for gender. Good evidence for biological imperative. | Extensively tested, good evidence | Singular form of jealousy | Mate Rivalry/Genetic Survival | Difficult to explain jealous aggression towards mate rather than rival. Mixed and weak evidence for predicted gender differences. Failure to specify pathways for interactions between emotions, thoughts and behaviours. |
| Developmental Childhood Attachment Security | Psychodynamic Theory, Hazan & Shaver – Adult Attachment Styles | Poor evidence for mechanism. Inconsistent evidence. Any effect explained by confounding variables. | Implausible – effect more likely to be explained by general anxiety. | Incoherent | Poor cross-sectional, correlational. Inconsistent but mostly unsupportive findings for mechanism. | Normal, Insecure and Aggressive Jealousy | Response to relationship threat. Childhood relationship with primary caregiver leads to repetition of security of this experience in Adult Romances | Any association with adult attachment is likely to be spurious and wholly explained by anxiety or neurosis. Failure to specify pathways for interactions between emotions, thoughts and behaviours. |
| Individual | | | | | | | | |

| Theory | Theoretical Background | Quality of Evidence | Theoretical Quality | | | | Scope and Causal Mechanism/s | Weaknesses general/in relationship to thesis question |
|---|--|---|---|--|--|--|--|--|
| | | | Consistency, Specificity, Temporality | Plausibility | Coherence | Evidence | | |
| DeSteno (2006) General insecurity, sensitivity, negativity | Atheoretical – correlational evidence | Inconsistent evidence – poor for other dispositional factors, Good evidence for self-esteem. | Plausible for relationship to self-concept | Incoherent – no experimental or longitudinal evidence. | Poor cross-sectional, inconsistent findings. | Insecure jealousy | Social comparison with potential rival, related changes in self-concept. External Locus of control, lower life satisfaction, less benevolent attitude to the world, easy arousal to environmental threats. | Evidence for dispositional mechanisms other than self-esteem poor. Modelled on the basis of correlation not theoretical plausibility or coherence. Failure to specify pathways for interactions between emotions, thoughts and behaviours. |
| Specific Mental Health Condition | Diagnostic categorisation of mental ill-health | Poor evidence – individual diagnostic categories, Low specificity between categories. Good for links with poor mental health. | Plausible link to poor mental health. Implausible as generalisation of particular symptom as an underlying trait applied to all situations not coherent with known presentations of mental illness. | Incoherent – no experimental or longitudinal evidence. | Inconsistent findings poor for categorisations. Good for link to poor mental health. | Obsessional, Paranoid, Insecure Depressive. Borderline Personality Disorder/Organisation, Obsessive Compulsive Disorder. | Underlying mental illness or sub-clinical trait for specific disorder leads to specific/related patterns of jealousy. | No evidence for specific patterns of jealousy related to mental health category. Failure to specify pathways for interactions between emotions, thoughts and behaviours. |
| Situational Perceived Relationship Commitment | Attachment theory | Good evidence, longitudinal, consistent. Specific and temporal. Findings consistent with suggested mechanism. | Plausible mechanism related to current relationship dynamics. | Evidence coherent | Good evidence – consistent across studies, relatively few studies. | Jealousy as one construct variation in intensity and expression. | Response to relationship threat. Jealousy is related to level of perceived partner and own commitment to the relationship at that moment in time. | Has no explanation for why some people might perceive less commitment from the partner where there is commitment (i.e., delusional beliefs about the partner). Failure to specify pathways for interactions between emotions, thoughts and behaviours. |

| Theory | Theoretical Background | Quality of Evidence | Theoretical Quality | | | | Scope and Causal Mechanism/s | Weaknesses general/in relationship to thesis question |
|-------------------------|--|---|---|--|---|--|--|--|
| | | | Consistency, Specificity, Temporality | Plausibility | Coherence | Evidence | | |
| Cultural | Anthropology | Reasonable evidence – influence of culture. | Plausible explanation for cultural differences, low level of detail and evidence for individual variation within cultures. | Coherent at a cultural level of explanation. | Anthropological and case study evidence. | Jealousy as one construct variation in intensity and expression. | Response to relationship threat. Jealous responses are related to both individual differences and proscribed cultural expressions, which are gendered. | Limited scope in relation to this thesis's questions. Relies on situational factors to predict variation in responses. Explains suspiciousness as a function of the environment. Doesn't explain suspiciousness unrelated to context (i.e., delusional). Failure to specify pathways for interactions between emotions, thoughts and behaviours. |
| Cognitive | | | | | | | | |
| Buunk's Exchange Theory | Social Exchange Theory, Interdependence Theory | Poor evidence – typology. Good evidence – dependency increases jealousy frequency/severity. | Plausible explanation for origin of jealousy with a particular relationship not linked plausibly to typology, no explanation of how people develop relative dependency. | No experimental or longitudinal evidence. | Weak – Correlational evidence. Evidence for typology weak. Good evidence for threat to rewards. | Reactive, Self-generated, Preventative types. | Response to relationship threat. Individual's appraisal of equality/fairness of effort put into relationship and relative rewards. | No evidence for power differences influencing dependency – main causal mechanism proposed. No evidence for typology or its specificity. Failure to specify pathways for interactions between emotions, thoughts and behaviours. |

| Theory | Theoretical Background | Quality of Evidence | Theoretical Quality | | | | Scope and Causal Mechanism/s | Weaknesses general/in relationship to thesis question |
|---|---|---|---|--|--|--------------------------------------|--|--|
| | | | Consistency, Specificity, Temporality | Plausibility | Coherence | Evidence | | |
| Mathes' Cognitive Theory | Lazarus Cognitive-transactional Theory of Stress, Coping, and Emotion | Evidence good – neuroticism. Poor evidence – other personality variables/process . | Plausible explanation for origin, and jealous outcomes including irrational jealousy. | No experimental , longitudinal, time-series evidence. Methodology used for testing theoretical processes not suitable. | Contradictory/No evidence for jealousy trait. Reasonable evidence for link between jealousy and neuroticism. | Normal and pathological | Jealousy due to personality – poor mental health/trait jealousy. Response to relationship threat determined by primary and secondary appraisal. | Hypothesised process not tested. Tests unsuitable for testing transactional theoretical basis. Lack of detail – origin or nature of link with poor mental health. Fails to specify interactions between emotions, thoughts and behaviours. |
| White & Mullen Process orientated model | Lazarus Cognitive-transactional theory of stress | Evidence suggests correlated phenomena. Little evidence/limited testing of process. | Plausible explanation for origin, and jealous outcomes including irrational jealousy. | Coherent – only one experimental test. Unsuitable methodology used for testing theoretical processes | Reasonable but not extensive testing. | Normal symptomatic, and pathological | Jealousy – a complex due to person's sociocultural past/current situation. Rationality influenced by ability to reality test. Response to relationship threat determined by primary/secondary appraisal. | No testing of main theoretical claim that suggested cause of irrational/rational jealousy – people's ability to reality test. Tests have not been suitable for testing the transactional dynamic theory is based on. Failure to specify pathways for interactions between emotions and thoughts. |

| Theory | Theoretical Background | Quality of Evidence | Theoretical Quality | | | | Scope and Causal Mechanism/s | Weaknesses general/in relationship to thesis question |
|-----------------------------|--|---|---|--|---|-----------------------|---|---|
| | | | Consistency, Specificity, Temporality | Plausibility | Coherence | Evidence | | |
| Bringle Transactional Model | Lazarus cognitive-transactional theory of stress | Evidence suggests correlated phenomena. Little evidence/testing of process. | Plausible explanation for origin, and jealous outcomes including irrational jealousy. Detailed processes for resulting rationality/irrationality. | No experimental, longitudinal, time-series evidence. Unsuitable methodology used for testing theoretical processes | Reasonable evidence no extensive testing. | Normal and suspicious | Response to relationship threat. Jealousy – interaction between person and environment. Relative priority given to exogenous and endogenous factors determines rationality of response. | No effective testing of proposed cognitive mechanisms. Tests have not been suitable for testing the transactional dynamic theory is based on. Failure to specify pathways for interactions between emotions and thoughts. |

Discussion and Conclusions

The following sections will further the evaluative comments made above regarding the various theories of jealousy. The aim is to draw conclusions as to what we can reliably deduce from the body of research about the nature and aetiology of jealousy as a whole, with a particular emphasis on suspicious jealousy.

It is apparent that, in outlining jealousy's components and giving some indication of possible organisation, descriptive theories can be usefully drawn upon to inform future structural examinations. However, it is evident that many aetiological theories are not supported by research and, as such, the theories should be viewed with caution. There is a need for the further development and improvement of theories in order to better understand the causal factors of jealousy.

Whilst a number of explanations outlined above may explain suspicious jealousy, there is a need for greater detail in theory about mechanisms that might result in jealous outcomes in order to further research those mechanisms/processes underlying jealousy, and how such mechanisms/processes interact to impact on the severity and duration of jealous thinking. In addition, there is a need for further research to better account for the suggestion of psychosis co-occurring with jealousy across normal, clinical, and forensic populations. Finally, it is suggested that it would be beneficial to develop an integrated framework (i.e., one which includes the wide range of identified potential causal factors (see Chapter 2), provides sufficient detail regarding the mechanisms involved in jealous thinking, and also provides a rationale for how these mechanisms result in the various outcomes associated with jealousy) as a starting point to conduct and promote additional research into areas such as suspicious thinking,

reality testing and psychotic tendencies in normal and sub-clinical jealous populations.

Most theories outlined above agree that jealousy constitutes a perceived threat to a valued relationship of a dual nature, relating to both the receipt of rewards (e.g., sex and companionship) afforded by the relationship to be under threat, and/or to the self-concept (in particular, self-esteem). In addition, the range of affect, cognition, and behaviours theoretically related to jealousy suggest that it is a heterogeneous phenomenon. There is also robust evidence (discussed above) regarding the context in which jealousy occurs, and that relational uncertainty is closely linked to the experience of jealousy (Bringle, 1988; Knobloch et al., 2001; White & Mullen, 1989). Furthermore, what determines an increase in severity is generally agreed upon (White & Mullen, 1989) as relating to one or more of the following factors:

- An increase in harmful behaviour to the self or a partner, with a focus on real or potential infidelity.
- An increase in the intensity and manageability of associated affect.
- The credibility (and bizarreness) of the source or nature of beliefs about the partner's real or imagined infidelity.

However, to date, there appears to be no reliable evidence as to what causes increases in the severity of jealousy. Additionally, many theories (with the exception of Buss's IMH [1992], and research in the area of sibling rivalry and insecure attachment) have not led to research being conducted, and therefore remain unsubstantiated. Furthermore, to date, no theories have been developed that integrate all empirically substantiated factors. The failure to specify pathways for and interactions between affective, cognitive, and behavioural outcomes related to jealousy means that we do not understand the mechanisms involved; more specifically, theory does not specify how

anxiety and cognition interact with situational factors to produce jealous outcomes. Finally, and perhaps most importantly, psychologists have not sufficiently explained or theorised the relationship between psychotic disorders (which frequently co-occur with jealousy, see Chapter 2) and irrational thinking in jealousy.

Whereas the IMH is well supported by adequate empirical research, most jealousy theories suffer from insufficient and inadequate testing of their suggested mechanisms; empirical tests of these theories are almost always assay-type correlational research of potential risk-factors for jealousy. This kind of research is inadequate for testing the causal mechanisms that these theories describe, therefore conclusions about the adequacy of each theory are difficult to make. However, despite the above limitations, it is suggested that psychologists could build upon the strengths of the major theories discussed above in order to construct a more comprehensive, explanatory theory of jealousy that includes greater elaboration of the differences in patterns and outcomes between rational and irrational forms of jealousy.

It may be better to consider most suggested causes of jealousy as potential risk markers that need further organisation into an integrated model (e.g., Ward & Seigart, 2008) and testing with sufficiently robust designs to establish temporal precedence. Some jealousy models (i.e., White & Mullen's (1989), and Bringle's (1991)) by incorporating and integrating aspects of biological, developmental, cultural and situational factors are sufficiently complex to accommodate multi-causal explanations. However, many cognitive theories currently omit developmental and biological explanations and their assumptions remain largely untested. In addition, better explanations for how developmental factors contribute to jealousy are needed, as

evidence for the currently suggested mechanisms (i.e., sibling rivalry, and insecure attachment) is, at best, weak (Clanton & Kosins, 1991; Kosins, 1984). Furthermore, the established contribution of evolutionary biological mechanisms to jealousy causation has been omitted from multifactorial models; however, it is felt that models would benefit from the integration of these mechanisms. In addition, there is a need for greater specificity as to how and which psychological vulnerabilities lead to specific behaviours associated with irrational jealousy.

The current theoretical consensus appears to be that jealousy is, structurally, a complex of negative emotion, thinking and behaviour. Furthermore, as jealousy is a heterogeneous phenomenon, it is likely that multiple factors result in discrete patterns of jealousy with different or multiple aetiologies. However, it is unclear how the complex is organised and no current jealousy theory adequately explains the phenomenon in a way that can account for: different types of jealousy (i.e., normal and irrational); potential interactions between affect and cognition; the impact of biological and cultural influences; delusional thinking patterns; and the choices made regarding the enactment of jealous thoughts. Evidence would suggest that jealousy occurs as a result of a complex system of non-linear interactions between biology and environment which are yet to be adequately presented within any one theory or model. Whilst theory can be seen to map the scope of the phenomenon of jealousy (and related behaviours), it lacks explanatory power and appears to have insufficient empirical evidence for many of the suggested processes, mechanisms, and structures. It is necessary for theories to present more detailed conceptualisations of jealousy's structure in order to determine distinct boundaries between normal and pathological jealousy.

Theorists have suggested that the focus on pathologising all jealousy has led to difficulties in defining the boundaries between normal and pathological jealousy (White & Mullen, 1991). Chapter 2 suggests that the difficulty in defining boundaries between normal and pathological jealousy may be due to normal and pathological jealousy forming a continuum related to escalating psychosis-like symptoms, and therefore that any boundary is not clear-cut. As such, it may be important to develop a model of jealousy that acknowledges any potential cumulative dimension.

There is a consensus that suspicious jealousy relates to irrational thinking and beliefs; however, it is suggested here that irrational jealousy may differ from paranoia only in content rather than form (see previous chapter). Clinicians and researchers alike have highlighted the presence of irrational thinking in jealousy (e.g., Bringle, 1991; Shepherd, 1961; White & Mullen, 1989); the frequent co-occurrence of paranoia or psychotic processes and jealousy comorbidity (Studies 3, 4, 7, 9, 10, & 14; Chapter 2); and the frequent co-morbidity with diagnoses that also have psychotic symptoms (Soyka, 1991; Soyka & Schmidt, 2011). Where theory does mention and attempt to explain jealous cognition, there is a paucity of empirical evidence with which to support or reject hypotheses. Furthermore, despite the overlap between paranoia and jealousy described above, jealousy theory does not detail how these phenomena might be linked when explaining how irrational thought processes arise and are maintained.

There is no published theory that maps all factors thought to be associated to the domain of jealous cognition. More specifically, despite evidence relating to the relationship between psychotic processes and suspicious jealousy (reviewed in the previous chapter), it remains unclear whether the whole domain of jealous cognition is

related to psychotic processes. The adequacy of jealousy measurement scales available to psychologists are a key limitation on the ability to determine the content of jealous cognition. If scales do not include the full range of factors then it will not be possible to ascertain, for example, links to psychotic processes.

In explaining jealous cognition, most theories focus on the more ‘normal’ types of jealousy and therefore give no explanation for suspicious thinking that is found in more pathological types of jealousy. It is suggested that this is due to most theories being based on economic models and using student or community samples. Those theories that do suggest potential mechanisms are not comprehensive in their explanations. For example, Mathes’ cognitive theory details a process by which affect and cognition lead to behavioural outcomes, but it does not suggest which situational factors lead to which specific behavioural outcomes, and Bringle’s transactional theory theorises about both normal and suspicious jealousy but only offers rudimentary specification as to how these might differ from each other. In addition, Knobloch et al.’s (2001) theory of relationship development provides details regarding the relationship contexts in which jealousy might occur; they suggest that ambiguity regarding relationship status or continuation is an important factor in jealous cognitions. However, the theory does not go beyond this to detail further mechanisms.

There appear to be only two theories that provide details of specific cognitive mechanisms that produce differences between thoughts in normal and suspicious jealousy. The first (White & Mullen, 1991) suggests differences in primary and secondary appraisal resulting in differences as to how reality is perceived. However only the second theory, that of Bringle (1991), suggests specific mechanisms, i.e., that

problematic jealousy might result from cognitive bias or distortion, whereas normal jealousy does not. The other theories, whilst describing normal and pathological type/s of jealousy, do not appear to give a coherent or sufficiently detailed account of mechanisms or processes by which suspicious thoughts are generated, maintained, or decay.

Five cognitive mechanisms are proposed by jealousy theories as playing a role in jealousy: elevated sensitivity to interpersonal threat (Bringle, 1991); cognitive bias and systematic error (Bringle, 1991); reality testing capacity (Dutton, 1994); thought rigidity (Mullen & White, 1989); and misperception of partner motives (Buunk, 1984; White, 1981). These cognitive processes are of particular interest as they are also central to paranoia (Bentall et al., 1991; Bentall et al., 2001; Freeman, 2007). However, despite cognitive theories having proposed a number of testable hypotheses, i.e., the five mechanisms identified above, there is very little evidence supporting the involvement of these mechanisms (see Table 11 for a summary of research).

Table 11. Summary of hypothesised cognitive mechanisms, related affect, and any research that tests these.

| Theoretically suggested mechanism | Current supporting research | Findings | Weaknesses | |
|--|-------------------------------|--------------------------|--|--|
| Threat perception (Bringle, 1991; Mullen & White, 1989) | Perceived threat | Rydell et al. (2004) | Both induced threats to self-esteem and negative social judgements of relationship compatibility increased jealousy. | Very small sample, predominantly female |
| | Threat perception & ambiguity | Cohen et al. (2014) | Ambiguous online messages to a potential romantic rival increase negative emotion, jealousy and intentions to confront. | Uses scenario responses |
| Self-referencing in ambiguous situations (Bringle, 1991; Mullen & White, 1989) | | NO TEST | | |
| Thought Rigidity (Bringle, 1991) | Rumination | Elphinston et al. (2013) | Jealous rumination is linked to relationship dissatisfaction. | SEM (N=199), using short-form measure of a scale, and latent (variables) consisting of two items. |
| | Over-valued ideas | NO TEST | | |
| Reality Testing (Dutton, 1994) | Reality testing | Dutton (1994) | Those with higher borderline personality organisation scores also had higher jealousy scores and higher levels of problems with reality testing. | This is a cross-sectional study not specifically designed to test links between jealousy and reality testing. |
| Interpersonal Sensitivity (Bringle, 1991) | Sensitivity to cues | Sobraske (2014) | Shows variation in jealousy cue sensitivity. | Test of functional hypothesis of IMH, males were tested for sensitivity to gender specific rival cues, compared to potential mates of higher mate value. |
| Negative Emotionality (Bringle, 1991) | Negative emotionality | Gehl (Thesis IOWA) | Depression and anxiety increase as jealousy severity and intensity do. | Unpublished, not peer reviewed. |
| | Depression | Mullen and Maack (1985) | Depression is present in over half the cases of morbid jealousy. | |

One of the main aims of this review was to understand the role and nature of irrational and suspicious thinking in jealousy. It seems likely that the combined influence of a number of weaknesses in theory have resulted in two main issues. Firstly, the dearth of research on thought disorders and non-delusional psychotic thinking in jealousy (i.e., where jealousy delusion is not the primary diagnosis), and secondly the absence of theory that explains the thought disorder/psychosis continuum in those displaying moderate/normal/subclinical jealousy.

Despite psychosis being proposed as a reason for jealousy in early psychiatric explanations (Freud, 1925; Jaspers, 1910; Kraepelin, 1910), thought disorder, psychosis, or paranoia have only received a very limited amount of attention from jealousy researchers. In situations where there is no primary delusional diagnosis, psychosis or thought disorder, psychosis has extremely rarely (Marazitti et al., 2003a, 2003b, 2010; Soyka & Schmidt, 2011) constituted a potential explanation for irrational jealousy – remaining firmly as an explanation for only very disorganised, delusional types of jealousy. Psychologists have predominantly studied jealousy as a mediating or predictor variable for relationship quality or outcome without making a distinction as to its rationality, and detailed explorations of irrationality have been ignored in most jealousy research. The most prolific theories (in terms of research generated) are felt to be the IMH and categorisation by adult attachment subtype. However, neither offer a perspective on suspicious aspects of jealousy; it is outside the scope of the former (with its focus on gender differences) and the latter has no supporting evidence for its claims.

A number of features of suspicious jealousy appear to be more consistent with a continuum model of jealousy. However, most theories account for the pathological

mood or behaviours associated with jealousy by implicitly or explicitly attributing the cause of suspicious jealousy to discrete mental health diagnoses. This potentially inaccurate attribution is perhaps responsible for an absence of suggested mechanisms to explain why irrationally jealous individuals display various indicators of psychotic thinking in varying degrees of intensity. In addition, the attribution could have led to the omission of the suggestion that conditions typically co-morbid with psychosis are also present in those with jealousy, and that increasing psychotic symptoms are linked to increasing jealousy severity (see Chapter 2) across a wide range of diagnostic categories, and across different populations (i.e., community, clinical, sub-clinical, and forensic).

Continuum theories of psychosis have been tested empirically and there is evidence that, for example, schizotypy and sub-clinical levels of psychosis frequently occur on a continuum in the general population (Bentall et al., 1988; Claridge, 1972, 1987; Johns & van Os, 2001). Unlike more recent theories of persecutory ideation and psychosis in general (e.g., Bentall et al, 1988; Freeman, 2007; Johns & van Os, 2001), current jealousy theory is lacking in explanatory detail, e.g., Marazitti et al. (2013) and Soyka (1995) (i.e., using simple linkage to mental health diagnoses), which limits its capacity to produce a cohesive framework and testable hypotheses for research on mild and moderate forms of suspicious jealousy in normal, sub-threshold, and subclinical groups. It is suggested that theories of jealousy should include a clear description of the mechanisms involved, and clear explanation for the relationship of psychosis-like symptoms, and suspiciousness to jealousy.

There is much literature on the topic of the interaction between thought and

emotion and how this interaction motivates an individual's behaviour (e.g., Ochsner & Gross, 2005; Sloman, 1987). In the broader field of psychology, negative emotion has also been suggested to cause thinking errors, i.e., people who feel inadequate, oversensitive and insecure make systematic errors in their perception and interpretation of events (Tarrrier et al., 1990). Despite the presence of various negative emotions related to jealousy (which form part of many jealousy definitions), theories of jealousy do not include detail of how emotion and thought interact; an omission that may result in the failure of theories/models to effectively explain the escalation and entrenchment of suspicious thinking, partner surveillance, and/or aggressive jealousy-related behaviours. It is suggested that jealousy theory has, perhaps, fallen behind advances in the understanding of psychotic mechanisms that suggest, on the basis of robust experimental evidence, that negative emotion (specifically anxiety) is causal in the escalation of irrational thinking in psychotic states (Freeman & Garety, 2004; Freeman et al., 2002, 2006).

Future Research and Development

The above critique of published theories of jealousy suggests a number of developments that could be made in the area. There is a paucity of research on jealous cognition despite, nearly three decades ago, several key authors identifying potential areas where research could improve understanding of underlying mechanisms of jealousy. These include areas such as: thinking biases; faulty cognition; causal factors that influence threat appraisal; factors that differentiate threats to self (esteem) and threats to relationship (Mullen & White, 1989); reasoning in situations of relational ambiguity (Bringle, 1991); and reality testing (Dutton, 1984; White & Mullen, 1989). Furthermore, unlike other reasoning biases and distorted thinking, jealousy has not been

researched in relation to emotional distress and anxiety. It is the view of the author that the area would benefit from research using more robust designs than existing research, for example using comparison groups, experimental, and time-series research. This needs to take place in order to better investigate mechanisms/processes suggested by jealousy theories, and to further develop existing relational models of jealousy.

It is suggested that, in order to avoid the aggregation of many likely causes under the umbrella of mental ill-health or disorder, it would be useful for researchers to view irrational thinking and paranoid processes in jealousy as potentially discrete. Therefore, research needs to be carried out to explore whether the systematic thinking biases suggested to underlie suspicious thinking (e.g., Freeman, Pugh & Garety, 2008) and indicative of a continuum of psychosis-like symptoms in the general population (van Os et al., 2008) are present during interpersonal conflict (where we can anticipate increased anxiety and distress), and furthermore, to determine whether these biases also relate to jealousy and how they influence relationship outcomes. Such research should include those specific thought biases, e.g., self-referencing of ambiguous cues, selective abstraction, and over-generalisation of isolated events, that have been hypothesised to relate to jealousy (Bringle, 1991). It would be of interest to see whether such biases were present in general (i.e., non-abusive) couple conflict, and how they are managed. Furthermore, it is considered to be important to explore the role of intuition in normal couple conflict and how threat detection differs in situations where one or both of the partners are irrationally suspicious. Lastly, it would be important to understand the role of emotion in the escalation of irrational thinking in interpersonal conflict, and how thought and emotional interactions evolve in these situations. In order to explore and better understand such issues, it is suggested that the phenomenon of jealousy would

benefit from further qualitative research using in-depth analytical techniques.

Furthermore, the field lacks detail regarding jealousy's structure. Jealousy has been explored predominantly as though it were a common set of symptoms (where irrational jealousy is related to the individuals having a particular type of mental illness or disorder), but seemingly without a robust evidence base for this suggested homogeneity. Furthermore, proposed jealousy types (outlined in the models reviewed above) may be a method artefact, due to the near exclusive use of factor analysis on groups of restricted range. As Mullen (1991) suggests, methods other than factor analysis should be used to explore the elements that constitute the construct and the structure of jealousy. Theories of jealousy have been developed within separate disciplines (i.e., psychiatry and psychology) on the basis of evidence from different participant groups (the former on the basis of clinical case study and observation and the latter largely with community or student samples). As such, theories lack a comprehensive, convincing explanation as to the mechanisms/processes underlying 'normal' and suspicious types of jealousy and specific related cognition and behaviours. By using solely dimensional explanations, most theory fails to adequately account for the notion (see Chapter 2) that jealousy may also form a continuum or spectrum whereby sub-clinical psychotic ideation may be present and explain the co-occurrence of paranoia and jealousy in community and forensic samples (Capaldi et al., 2012; Stith et al., 2004), irrational jealous thoughts, and some types of problematic jealousy.

It is evident that there is a need for a more comprehensive analysis of the structure of jealousy, the related feelings, thoughts and behaviour, and the potential overlap between jealousy and dimensions of paranoia across both clinical and non-

clinical samples. This review highlights that jealousy comprises a number of different facets, and that we might expect to see these facets represented as a hierarchical continuum or a number of continua representing underlying latent cumulative dimensions. Furthermore, there is a need to explore these by using techniques other than factor analysis, such as multidimensional scaling (MDS) and principle component analysis (PCA) (White & Mullen, 1989) in order to reveal further detail about the organisation and intensity of different facets of jealousy. If it can be assumed that jealousy has a cumulative, hierarchical structure, we would anticipate that structures would emerge that are indicative of a continuum, similar to those found in schizotypy (Kidd et al., 1998), psychosis, and psychopathy.

Theory Development

In addition to the need for further research (as outlined above), there is also a need for further theory development in order to integrate research findings and provide additional testable hypotheses. It is suggested that future theories are integrative (e.g., see Beech & Ward, 2004) in order to provide a fuller explanation of jealousy. It is further suggested that theories need to include the potential underlying psychotic dimension of jealousy, and that authors attempt to explain how emotional distress, anxiety and irrational thinking might interact to escalate the rigidity, severity, and frequency of jealousy experience and expression. It also appears probable (see Chapter 2) that neurosis and psychosis are likely to interact to play a part in the escalation of irrational thinking in jealousy; this issue should be taken into account in the development of jealousy theory.

In conclusion, whilst making an invaluable contribution to understanding many aspects of jealousy (e.g., its evolutionary basis, components, and associated

behaviours), individual theories have failed to adequately integrate and explain all facets of jealousy and to identify factors that differentiate between normal and pathological jealousy (White & Mullen, 1991). The cognitive processes involved and explanations for the role of erroneous, suspicious thinking in jealousy are frequently insufficiently detailed or have not received adequate empirical testing. Therefore, there is a need for further empirical tests to be conducted to substantiate claims made by authors of theories in relation to the mechanisms they suggest are responsible for suspicious thinking in jealousy, as well as a need for the further development of jealousy theories.

CHAPTER 4: THE STRUCTURE OF JEALOUSY AND ITS RELATIONSHIP TO PARANOID IDEATION

When developing and testing a theory it is important to begin by examining the content (Roskam, in Borg, 1979, p.183) and structure (Canter, 1985) of the phenomenon. There are multiple, previous classifications of jealousy, and it has been associated with a wide range of constructs (see Chapters 2 & 3). However, as detailed in Chapters 2 and 3, theory and evidence related to jealousy is unclear, and what constitutes and causes jealousy, and its latent structure are not well understood and are contested. As evidenced by the numerous definitions, typologies, and classifications. This chapter will describe an empirical exploration of jealousy's underlying structure using multidimensional scaling.

Whilst, classification is frequently the first stage in understanding a phenomenon, and the various things that constitute it (Guttman, 1974). There remains a lack of agreement about what differentiates pathological and normal jealousy or indeed if they are different kinds and what processes or features distinguish adaptive from pathological jealousy. A detailed analysis of the structure of jealousy and its components, may lead to a better understanding of the scope and inter-relationship of the various components, and any processes involved in the escalation of its intensity. Consequentially, the relationship of jealousy's structure to theory, may help to understand both variation in intensity and type and potential causes of jealousy and may enable better clinical interventions and more comprehensive measures to be developed.

Jealousy has been understood as a unidimensional (e.g., IJS; Mathes and Severa, 1981), and as a multidimensional categorical construct (e.g., MJS, Pfeiffer & Wong,

1989). Recent work (Lima et al., 2017) speculating that it might be dimensional, suggests that jealousy's structure is still contested. It is currently unclear which of these viewpoints accurately represents jealousy and there is little empirical evidence as to whether jealousy has a categorical or dimensional structure or a combination of these.

Previous attempts to understand the structure of jealousy using factor analysis have suggested differing structures, e.g., five factors (Marazitti et al., 2010): *obsessive, paranoid, interpersonal sensitivity, self-esteem, abandonment fears*, based on items generated by the researchers using diagnostic criteria from *The diagnostic and statistical manual of mental disorders* (4th ed.) (*DSM IV*; American Psychiatric Association, 1994). Alternatively, six-factors distinguished by differing threat source were suggested (Mathes & Severa, 1981), two factors related to attachment style, (Dutton, van Ginkle, & Landolt, 1996); or three types *reactive, anxious and possessive* (Barelds & Dijkstra, 2006). Each of the proposed structures has been reviewed in depth in Chapter 3 and therefore an analysis will not be repeated here. Furthermore, there is an ongoing debate about what discriminates normal and pathological jealousy (see Chapter 3, for a discussion). It is fair to say that there is little clarity about jealousy's structure as a whole.

It is likely that previous understandings of jealousy's structure, based on factor analysis, are at least somewhat accurate and representative of the universe of jealousy. However, factor analysis tends to reproduce structures within the data (observations) and therefore to also reproduce the theoretical approach of the author (Guttman, 1982). Whereas, a facet approach, by mapping regions, and using multidimensional scaling as an analytic technique, gives an indication of the underlying content space and structure

of the phenomenon (Guttman, 1982; Shye, 1988). There is currently no integrated evidence-based framework by which to understand jealousy. The theoretical literature suggests a wide number of items might comprise jealousy and it is unclear whether current measures comprehensively measure all these aspects, or whether important factors/components are omitted. Also, despite previous attempts to map jealousy (Sobraske et al., 2013), and therefore describe everything that constitutes jealousy, this has not led to more comprehensive scale or theory development.

Measures are frequently designed to reflect the theoretically proposed components and latent structures suggested to underlie them and therefore by examining the structures within a number of valid measures of a construct it should be possible to determine the validity of theoretically proposed components, and processes (Guttman, 1974). A number of frequently used measures of jealousy, Bryson's Jealousy Factors (Bryson, 1976;1977); Chronic Jealousy and Relationship Jealousy Scales (White, 1981, 1984, 1985a,1985b); Interpersonal Jealousy Scale (Mathes & Severa, 1981); Interpersonal Relationship Scale (Hupka & Rusch, 1979, 1989), Multidimensional Jealousy Scale (Pfeiffer & Wong, 1989), Self-Report Jealousy Scale (Bringle et al., 1979); and the Survey of Interpersonal Relations (Bush et al., 1988); were subject to a review by White and Mullen (1989) and found to have generally poor psychometric properties. Subsequently developed measures, e.g., the Questionario de Gelosia (QUEGE; Marazitti et al., 2010) have been used in few studies, and therefore preliminary evidence about scale quality is available. However, comparison of the results of the studies using the QUEGE (Lima et al., 2017; Marazitti et al., 2010; Tani & Ponti, 2016) shows that at least one of the sub-scales, *interpersonal sensitivity*, appears to have been misnamed in order to fit a clinical diagnosis that does not adequately

encapsulate or describe the items. Also, the factor structure appears unstable and does not relate well to the proposed underlying theory.

Although White and Mullen's (1989) review is now somewhat old, it reviews the psychometric properties of most measures in current use and is therefore included here. The review suggests that the poor psychometric qualities of most romantic jealousy measures result from multiple causes including: a focus on relationship quality rather than jealousy itself, inclusion of items that relate to non-romantic relationships (e.g., siblings), and the measurement of envy rather than romantic jealousy. The review further suggests that single or few item measures, and those measures that relate to conditions antecedent and correlated to jealousy (e.g., Bringle et al., 1983; Buunk, 1982) also are unlikely to measure jealousy effectively. However, as discussed in the following paragraph, few measures do appear to somewhat validly and reliably measure jealousy.

Two scales that measure only jealousy are the Interpersonal Jealousy Scale (IJS; Mathes & Severa, 1981) and the Multidimensional Jealousy Scale (MJS; Pfeffer & Wong, 1989). The first of these is the most frequently used measure of total jealousy of a number of unidimensional measures of jealousy, e.g., (Bringle et al., 1971; White 1981). The second, the MJS was designed with a dimensional approach in mind, to measure three dimensions of jealousy proposed by theory, emotional, cognitive, and behavioural jealousy. These two scales have both been judged to have a reasonable reliability and validity by White and Mullen's (1989) review.

Scale Development

Development of both scales used a classical test theory approach to confirm

reliability and structure. However, neither scale structure was empirically derived, e.g., by using factor analysis, during development. The following section details development, administration and structure of each scale.

The Interpersonal Jealousy Scale (IJS; Mathes & Severa, 1981) was developed as a systematic measure of jealousy for research purposes. Development involved generating face-valid items, to result in a 28-item final scale, with each item rated on a nine-point Likert scale (from *False* — with a midpoint of *Neither* — *True*). High scores indicate higher levels of jealousy. The scale has a good internal reliability ($\alpha = .92$) for both males and females. The initial scale had no reported factor analysis but was later validated on 79 married or dating couples (Mathes, Phillips, Skowran, & Dick, 1982) which suggested six components: *obvious threat*, *threats from partner popularity*, *untrustworthy partner*, *old dates*, *partner's indifference*, and *sex differences*.

Obvious threat susceptibility explained 62.2% of the total variance and relates to real threats based on the actions of others or the partner. *Threats from partner popularity* was proposed to relate to threats due to a partner popularity with other people including sexual rivals. *Untrustworthy partner* related to partner behaviours that indicated an attraction to other people and that they were likely to be or had been unfaithful. *Old dates* referred to threats related to previous relationships. *Partner's indifference* is related to the partner's lack of commitment to the current relationship. The final factor *sex differences* related to gender-based response differences. The factors were not used in scale development or to provide sub-scales.

The MJS (Pfeiffer & Wong, 1989) was developed to measure jealousy as a multidimensional construct, based on an approach derived from (Bringle, 1981; Bringle

and Buunk, 1985; White, 1984). Scale development involved factor analytic refinement of face-valid items related to definitions of emotional, cognitive and, behavioural jealousy. Jealousy is understood as partly normative, consisting of thoughts and feelings experienced by most people that are designed to either protect the relationship or detect infidelity, or alternatively as emotions, thoughts and behaviours that are based on conditioned emotional responses, or otherwise as imagined events (paranoia) (White, 1984). It is suggested that emotional jealousy is a normative response to either realistic threats or a is conditioned response, e.g., when a remarried man experiences jealousy about his ex-wife's new partner. Whereas, cognitive and behavioural jealousy are non-normative. Factor analysis resulted in three proposed factors, each related to the initial definitions. The final scale items all had Pearson Item/Total correlations above 0.6. Coefficients for each sub-scale were — *Cognitive*, $\alpha = 0.92$; *Emotional*, $\alpha = 0.85$; *Behavioral*, $\alpha = 0.89$. Across five studies, the scale was found to be stable and reliable, with very good internal consistency (α range .83 – .92) (Elphinson, Feeney, & Noller, 2011; Lucas, Pereira, & Esgalhardo, 2012; Pfeiffer & Wong, 1989). It is a 24-item (three sub-scale) self-administered questionnaire developed for use by researchers for measurement of the general population. The scale is divided into three sub-scales, *emotional*, *cognitive* and *behavioral* jealousy. Each sub-scale is rated on a seven-point scale, as follows: *Cognitive* (rated from *All the time* – *Never*); *Emotional* (rated from *Very pleased* – *Very upset*) with high scores indicating high levels of emotional jealousy; and *Behavioral* (rated from *Never* – *All the time*) with high scores indicating high levels of behavioural jealousy. Unlike White's (1981) suggestion that jealousy was an essentially rational (i.e. based on real threat) sequence of unpleasant emotion, cognitive appraisal, and cognitive or behavioural coping, Pfeiffer and Wong (1989) suggested that

jealousy can have apparently irrational elements, with no set sequence to the individual jealousy components which can operate in parallel and interact with one another.

Principle components factor analysis during scale development revealed three discrete factors, each with high internal consistency. The *emotional* sub-scale explains 11.7% of the variance and consists of eight items that measure emotional responses to jealousy threats, it is proposed to be composed of two types of emotion that which is due to a real threat and that which is a conditioned response, for example, feeling jealous about a previous partner. The *cognitive* sub-scale explains 33.1% of the variance and is composed of eight items; it forms a measure of jealous thinking that includes two types of thought, (a) that based on the appraisal of real threats, and (b) paranoid thoughts based on imagined threats. The *behavioral* sub-scale explains 13.6% of the variance and is composed of eight items that measure two discrete behavioural responses to jealousy (which do not have separate sub-scales) (a) detective actions items and (b) protective actions.

In summary, theories on which the IJS and MJS scales are based, suggest that jealousy is structured according to personality-related components: emotion, cognition and behaviour (Pfeffer & Wong, 1991; White & Mullen, 1989). Furthermore, that there is further division on the basis of threat source (Mathes & Severa, 1981) and that behaviour is divided into detective and protective actions (Rodriguez, DiBello, Øverup, & Neighbours, 2015). Other jealousy theory, reviewed in Chapter 3, suggests that we might expect to find distinct regions that represent manifestations of jealousy related to different underlying psychiatric conditions (Marazitti et al., 2010). However, on the basis of the review described in Chapters 2 and 3, it is more likely that we would expect a structure for jealousy, showing (a) clear divisions between normal and pathological

types, (b) that demonstrates a psychosis/schizotypy-like cumulative structure related to increasing anxiety (Freeman et al., 2002) and suspiciousness, (i.e. escalation of perceived threat where there is a lack of real-world evidence in support of the threat), (c) that has divisions related to conditioned responses (related to past experience) and (d) that has divisions related to the use of ambiguous cues, (imagined threats, paranoid ideation/suspiciousness).

Theoretical Rationale for a MDS Approach

Despite competing theories and disagreement about what comprises jealousy, (as discussed in Chapter 2), the body of literature points at two general forms, normal and pathological. Although, the literature makes frequent reference to personality dimensions and subcategories of jealousy, i.e., subclinical typologies, for example Marazitti et al. (2010). It is unclear what predispositions, basic evolutionary mechanisms, or experiential learning cause increased jealous pathology. However, the systematic literature review reported in Chapter 2, points towards a more general paranoid dimension underlying some, if not most, presentations of pathological jealousy. Jealousy has not previously been explored in relation to established measures of clinical or sub-clinical paranoid thinking, and therefore it is not clear if, or how, dimensions of paranoid thought might be related to jealousy in the general population.

The current study proposes to use a number of established jealousy scales to explore their construct validity by examining structures within them. Then to determine a comprehensive set of elements that reflect both the structure of the diverse scales and collectively describe the underlying theoretical elements. Then to identify any omissions in the measures current mapping of the domain (Shye, 1988, 1989; Shye & Elizur, 1994). Additionally, by using two paranoia measures designed for use in the

general populations, those aspects of jealousy most associated with paranoid thought will be identified, to determine if there is a basis for a latent paranoid dimension in jealousy. Facet theory (Shye & Elizur, 1994) will be used to identify the pattern of correlation between jealousy variables and paranoia variables and inquire whether they form a well-defined region in the SSA depicted jealousy space. If these variables are indeed related, then by the continuity principle (Shye, 1998, p. 166; Shye & Elizur, 1994. p. 101), a distinct jealousy sub-space would be identified that is closely associated with paranoia.

Multidimensional scaling (MDS) is a non-parametric data reduction technique with a number of advantages over alternatives i.e., factor analysis (FA) and principle component analysis (PCA) (e.g., no parametric assumptions are made, it is applicable to ordinal data, Borg & Groenen, 2005). It overcomes several limitations of other forms of structural analysis (e.g., factor analysis) such as over-inclusive factors, sensitivity to sample characteristics, frequency bias and factor rotation problems of other methods that explore structure (Kline, 1999; Nunnally, 1978). MDS is a useful way to understand relationships between all items in an analysis simultaneously and uncover the underlying psychometric structure, any processes involved and to infer from these the interplay between theory and empiricism. Statistical associations are represented as geometric distances between variables, where more proximal items/points are more related (e.g., Borg & Groenen, 1997; Coxon & Davies, 1982), with points mapped in a predefined geometric space, usually two or three dimensions. Interpretation of the structure and meaning of regions or facets uses both theoretical and statistical evidence and logic (Guttman, 1959). The use of this technique enables examination of dimensionality and interaction between structure and theory via scalograms which

represent the relationships between items within a Euclidean geometric space that is easily interpreted (Bishopp & Hare, 2008). There are many different forms of MDS technique, which if not degenerate, produce similar structures (Borg & Groenen, 2005). Smallest Space Analysis (SSA) is most suited for creation of robust, structural non-linear solutions where the items or objects are thought to belong to the same universe of objects or items, specifically the same phenomenon or construct (Guttman, 1968).

The aim is to conduct an exploratory MDS analysis to identify patterns in the structure of jealousy and the relationship of structure to prior theory. Specifically, can regions be identified that relate to distinct modes of functioning (cognitive, affective, behavioural), sources of threat, or that relate to distinct personality pathologies. By using a large dataset of measures the aim was to explore the structures within a number of concurrent tests aimed at exploring jealousy and its hypothesised relationship to paranoia. The results were intended to (a) determine the construct validity of the measures, which can be seen as a direct reflection of underlying theoretical elements; and due to each scales assessment of slightly varying aspects of jealousy, (b) to identify a set of theoretically valid components that provide a comprehensive classification of jealousy; (c) to determine to what extent the measures represent the wider theoretical literature; (d) to highlight the similarities and difference between aspects of the jealousy complex (behaviours/affect/cognitions), as well as identifying any underlying dimensions; and finally (e) to compare these similarities, differences and dimensions to those of paranoia.

It is hypothesised that jealousy will form distinct sub-regions related to normal and suspicious jealousy and will also form a continuum related to escalating suspicious

thought. Specifically, that when subjected to MDS, variables will parallel those observed in the structure of paranoia, with anxiety items being closely related to escalation, and with a distinct suspicious region.

It is also hypothesised that suspicious jealousy will show a closer relationship to paranoia than it does to more normal forms of jealousy. An SSA will be used to identify which paranoia items are more closely related to jealousy. This will be tested with reference to facet theory (Shye & Elizur, 1994), to enquire which jealousy items are more highly correlated with paranoia items and whether distinct sub-regions are formed that relate to aspects of paranoia. If they do, then a distinct content subspace is identified that is best associated with suspicious thinking regardless of theme.

Method

Participants

Two hundred and fifty adults (Age range 18-29 years, 224 female) took part. Sampling size and power estimates were made using *G power* (Faul, Erdfelder, Buchner, & Lang, 2007). Participants were undergraduates recruited via the University of Birmingham Research Participation Scheme, who received course credit for involvement. Consent was gained for each participant prior to scale administration. Study procedure and data collection, along with all other research in this thesis, followed the Code of Ethics and Conduct of the British Psychological Society (2015) and was approved by the Science, Technology, Engineering & Mathematics Ethical Review Committee of the University of Birmingham, ERN15-1423 (see Appendix C).

Measures

Participants were asked to complete four questionnaires that measure various

components of jealousy and paranoia. The jealousy measures are described above. Measures of paranoia are described below.

Paranoia Scale.

The Paranoia Scale (Fenigstein & Venable, 1992) has been one of the most widely used dimensional measures of paranoia. It was developed to measure paranoia in the general population. Development involved several rounds, with items generated initially using the Minnesota Multiphasic Personality Inventory (MMPI; Hathaway & McKinley, 1942). Items for each of five aspects of paranoia identified within the MMPI were selected and combined with items from several other paranoia scales. The resulting 32 items were administered to 144 participants (86 female). Items were then eliminated on the basis of item/total correlation, factor loadings, and extreme skew. Resulting in a 20-item scale, with a reliability coefficient of $\alpha = .84$. Factor analysis (unrotated) using a sample of 581 complete surveys over 4 studies, revealed two factors, but no item loaded more than 0.3 on the second factor. The final scale includes items that assess self-consciousness, self-reference and targeting. Items are rated on a 5-point scale (1–5), with overall scores ranging from 20–100. Higher scores indicate higher levels of paranoid ideation. The Paranoia Scale (Fenigstein & Venable, 1992) is unidimensional with a single factor explaining 25% of the variance, which is proposed to relate to an underlying factor of paranoid responses, self-referencing.

The Green Paranoid Thoughts Scale (G-PTS; Green et al., 2007) was developed to explore multiple dimensions of subclinical paranoid. It considers wariness of others to some extent as a potentially adaptive trait that should exist dimensionally in the population. Development included deriving initial items using author experience, other scales, clinical reports, and definitions of persecutory and self-referent thoughts. An

initial 95-item instrument was tested through three surveys, resulting in 353 complete surveys of people with no mental illness, and 50 surveys of those with current persecutory delusions. The final 24-item scale was achieved through analysis, including a PCA, which suggested two factors. Final items were selected for face-validity, item/total correlations, inclusion of conviction, preoccupation, distress and ability to discriminate between general and clinical populations. Reliability coefficients are respectively for general/clinical populations, $\alpha=.95$, $\alpha=.90$. The resulting questionnaire is self-administered, and measures paranoid ideation, with two sub-scales each of 16 items. *Part A* measures ideas of social reference and *Part B* ideas of persecution, ($\alpha = .90$ in clinical samples; $\alpha = .95$ in non-clinical samples; test-retest reliability, ICC coefficients of .83). Items are rated on a 5-point scale (*Not at all—Totally*). Higher scores indicate higher levels of paranoid thinking. Paranoid thinking incorporates subscales of belief conviction, preoccupation and distress. The *persecution* sub scale explains 44.2% of the variance and consists of eight items that refer to beliefs that others are intending harm towards the responder and that they are singled out for unfair treatment. The *self-reference* sub-scale explains 5.5% of the variance and consists of eight items that refer to self-referent thoughts that the respondent is being observed, for example that they are being watched, or communicated with (e.g., given information such as hints, double meanings etc...). The scale also shows convergent validity in both large clinical and non-clinical samples (Green et al., 2007).

Procedure

The questionnaires, were completed by respondents as part of a test battery in which demographic data was also collected, the study was completed online using the *Qualtrics* interface (Qualtrics, 2014), with anonymisation performed by the software.

Full item descriptions for the questionnaires with abbreviations used in the analysis are available in Appendix E. Participants were recruited on a voluntary basis and unless participants opted in for a further study (reported in Chapter 6) their responses were completely anonymous and confidential. Participants were given a brief explanation of the study and then asked to complete each question by indicating their response on an online response form. Once completed, the results were collated by the online interface into *Excel* for analysis.

MDS progresses through several distinct phases of analysis. The procedures and the results of each phase are discussed below.

Data Analysis

Data generated from the questionnaire responses, were coded according to the guidelines in the original psychometric test manual or original authors' paper. Data were screened using Little's Missing Data (Little & Rubin, 1987) and found to be Missing Completely at Random (MCAR), ($\chi^2=19455.74$, $N=250$, $p=1.000$). Missing data (7 data points) were then replaced sub-scale by sub-scale by the median trend method (using all data for estimation) and means and standard deviations checked to ensure that there was no significant difference before and after missing data replacement. Descriptive statistics were then generated for each total score and sub-scale score of the included questionnaires and compared to previously reported norm scores (reported in Table 12). Data were then analysed using smallest space analysis (SSA; Lingoes, 1973). SSA is a Non-metric multidimensional scaling (MDS) procedure based on the assumption that data represented as Euclidean distances are more readily interpreted visually due to their geometric organisation, as each variable is displayed in relation to the others, and the

proximity of points in the plot relates to the strength of their association. A non-metric model is used as it is assumed that the relationship both between items and between participants is not equivalent, e.g., that one person's response of '6' (1 point less than the maximum of 7, *Very upset*) on item 13 of the IJS scale 'If my partner were to date others I would feel unhappy', is not exactly the same level and type of emotion and therefore equivalent to another participants response to the same question. Also, that a participant's score on this item may not exactly be equivalent to their response of '6' for another item within the scale, or when compared to a '6' on another scale.

SSA represents co-occurring variables, in this study jealousy and paranoid thinking, as distances in a low dimensional geometric space. The SSA program (HUDAP; Amar & Toledano, 2001) generates relationship coefficients between all variables. These coefficients (correlation matrix) are used to generate a visual representation of variables with points representing items. Items that are closer to each other have higher associations with each other. Items that are further away from each other are more dissimilar. SSA represents the ranks of the distance between points and the ranks of the relationship coefficients. It captures the relative size of association and is therefore appropriate for testing assumptions about dimensions, categories and process. Geometric overlap between items is indicative of conceptual equivalence, that items are parallel, and therefore redundant (Kline, 1986).

MDS models have been used productively in a number of areas from intelligence (Guttman, 1954), to educational coping behaviours (Ding & Yang, 2013). The particular usefulness of SSA is that it represents scores as rank-ordered distances in geometric space, and therefore can be used for the analysis of data from — differently

scaled questionnaires, ordinal data, and data that are not likely to conform to parametric assumptions (such as paranoid thinking in the general population that is likely to have a strong negative skew). MDS models, unlike other factor reduction models [e.g., factor analysis, cluster analysis and structural equation modelling (SEM)], give a visual representation that indicates the relationship of each dimension to the other, in an easily interpretable form and so can give an indication of cumulative latent dimensions, e.g., a schizotypy dimension. To test hypotheses about dimensions and structure, the SSA configuration is converted from co-ordinates to points on a visual map and the patterns between points are examined.

Scales relating to each construct (jealousy or paranoia) were first entered individually, with separate analyses conducted for each jealousy or paranoia scale, before analysing all scales together in order to sequentially model and explore the variables and therefore constructs. Each analytic phase and the related results are reported phase-by-phase.

Analysis and Results

Sample Characteristics

The sample comprised 250 participants (224 females). Who were cohabiting (n=12), single (n= 73), in a stable relationship more than 1 month (n=150), dating but not cohabiting (n= 14). In the current sample, the *persecution* sub-scale scores approximated those in prior, non-clinical studies using the same measures (Green et al., 2008). However, the range of scores and overall mean, were elevated for the *self-reference* subscale. The mean and standard deviation in clinical samples (Green et al., 2008) is 46.4 (16.4) for the *self-reference* sub-scale, compared to the mean of the non-

clinical sample which was 26.8 (10.4). For the *persecution* subscale the clinical groups had a mean of 55.4 (15.7) compared to non-clinical group mean 22.1 (9.2). The current study shows a higher mean score for the *self-reference* subscale than that obtained for non-clinical samples, and *persecutory* subscale scores similar to those obtained for the non-clinical sample in Green et al. (2008).

Most sample mean scores (and where available, standard deviations) were similar to previous norm groups on each of the measures (see Table 12). There were no significant differences between male and female scores. However, *t*-tests revealed significant differences between the sample and the norm groups on the *self-reference* subscale of the G-PTS and on each subscale of the MJS, with elevated scores for both male and female subgroups in the sample, with the exception of the MJS *behavioral* subscale for males in this sample (*t*-test results are reported in an additional table in Appendix D). The distribution of scores indicates that there is sufficient variance in severity and intensity in each of the measured variables to assume that the sample contains participants who represent the full expected range of scores within a community sample, with some participants receiving scores within the clinical range. That a sub-group of participants show elevated scores on both the G-PTS *self-reference* subscale and the majority of MJS subscales, is consistent with the studies hypothesis that elevated paranoid ideation is related to increases in jealous ideation. Norm group scores show similar variation and mean scores for both male and female participants suggesting that gender does not substantially influence the measured variables

Table 12. Sample scores (compared to population norms for each of the scores).

| Scale (subscale) | Sample scores | Norm scores (and where available clinical groups) |
|---|--|--|
| IJS; Mathes, Philips, Scowran, & Dick (1982), U.S. students | | |
| | Male: <i>M</i> 145.42, (<i>SD</i> 37.45, range 67-201) Female: <i>M</i> 132.24, (<i>SD</i> 33.51, range 43-224) Total: <i>M</i> 133.71, (<i>SD</i> 34.31, 43-224) | Male: <i>M</i> 139, <i>SD</i> 35.69 Female: <i>M</i> 127.04, <i>SD</i> 36.02 Total: Not reported |
| MJS; Elphinson et al. (2011), Australian students; Pfeiffer & Wong (1989), U.S. students; Radev & Hedrih (2017), Serbian students | | |
| Emotional | Male: <i>M</i> 39.69, (<i>SD</i> 4.3,range 34-50) Female: <i>M</i> 42.35, (<i>SD</i> 6.88, range 10-99) Total: <i>M</i> 42.08, (<i>SD</i> 6.70, range 10-99) | Male: <i>M</i> 26.89, male;),(<i>SD</i> & range not reported) Female: <i>M</i> 30.30 female),(<i>SD</i> & range not reported) Total: Not reported |
| Cognitive | Male: <i>M</i> 21.19 (<i>SD</i> 10.36, range 8-43) Female: <i>M</i> 20.57 (<i>SD</i> 10.44, range 8-56) Total: <i>M</i> 20.63(<i>SD</i> 10.42, range 8-56) | Male: <i>M</i> 8.40),(<i>SD</i> & range not reported) Female: <i>M</i> 8.32),(<i>SD</i> & range not reported) Total: Not reported |
| Behavioural | Male: <i>M</i> 13.05 (<i>SD</i> 4.92, range 8-27) Female: <i>M</i> 17.61 (<i>SD</i> 8.55, range 8-99) Total: <i>M</i> 17.18, (<i>SD</i> 6.52, range 8-99) | Male: <i>M</i> 12.52 Female: <i>M</i> 14.59 Total: Not reported |
| PS; Fenigstein & Vanable (1992), UK students | | |
| | Male: <i>M</i> 39.65, (<i>SD</i> 14.72, range 20-64) Female: <i>M</i> 44.51, (<i>SD</i> 16.52, range 20-100) Total: <i>M</i> 44, (<i>SD</i> 16.38, range 20-100) (95.6 % would be classified with some level of sub-clinical paranoia) | Male (<i>M</i> 43.3), (<i>SD</i> & range not reported) Female(<i>M</i> 42.3),(<i>SD</i> & range not reported) Total: <i>M</i> 42.7 (<i>SD</i> 10.2, range 20-100) |
| G-PTS ; Green et al. (2008) UK students and workers, clinical comparison sample) | | |
| Self-Reference | Male: <i>M</i> 30.62, (<i>SD</i> 11.28, range 16-56) Female: <i>M</i> 32.89, (<i>SD</i> 12.36, range 16-67) Total: <i>M</i> 32.66, (<i>SD</i> 12.25, range 16-67) 14.8% of this sample scored above the clinical mean. (96% had some paranoid thoughts, and 84% would be classified with sub-clinical paranoia related to self-referent thought) | Nonclinical <i>M</i> 26.8 (<i>SD</i> 10.4), Clinical <i>M</i> 46.4 (<i>SD</i> 16.4) (male and female not defined) |
| Persecution | Male: <i>M</i> 23.73 (<i>SD</i> 12.12, range 16-61) Female: <i>M</i> 23.53, (<i>SD</i> 11.15, range 16-82) Total: <i>M</i> 23.55, (<i>SD</i> 11.23, range 16-82) 3.6% of the sample scored above the clinical mean (76.4% had some paranoid thoughts, and 58% would be classified with sub-clinical paranoia related to persecutory thoughts) | Nonclinical <i>M</i> 22.1 (<i>SD</i> 9.2) Clinical <i>M</i> 55.4 (<i>SD</i> 15.7) (male and female not defined) |

Analytic Procedure

Amar's (1997) weak monotonicity coefficient (*MONCO*) for ordinal data was used to identify any non-linear correlations (Amar & Toledano, 1997), which are common in social data. Reverse scored items were recoded, and a correlation matrix

was computed from the coefficients. SSA-1 was then used to create a visual representation of the questionnaire items. The coefficient of alienation (Borg & Lingoes, 1987) indicates how well data fit a particular spatial representation, with higher coefficients indicating poorer fit. Guttman (1968) suggests that values lower than .15 are acceptable. However, Borg (2019) suggests that an acceptable fit will depend on the number of items, the error in the data, and the logical strength of the theoretical interpretation. It has been suggested that in addition to Borg's determinants of acceptable fit, parsimony is of greater importance than strict fitting criteria (Shye, 1998). The regional hypothesis (Coombs, 1964) suggests that items with a common theme will be found in the same region of SSA space. For all sections of these results, a visual representation was partitioned to identify distinct regions that represent conceptual, statistical and theoretically related sub-components interpreted on the basis of items content.

Results from Phase One: Jealousy Scales

1. Interpersonal Jealousy Scale (IJS). The result of the SSA of the IJS is presented in Figure 3 in two dimensions. Each point is a jealousy item derived from the IJS, (Mathes & Severa, 1981). The closer any two variables are the more likely that when a participant responds to one, they will also respond similarly to the other. The Guttman-Lingoes coefficient of alienation for a three-dimensional solution is .13 in 12 iterations, indicating a reasonable fit to the spatial representation of the items (Guttman, 1968). This coefficient is a measure of how well the analysis fits into the two-dimensional visual representation of interrelationships between the scale items. Figure 3 shows a structure with three regions that appear to represent two latent scalar structures.

A number of items appear to form a distinct and unrelated latent structure

(indicated by orange circles in Figure 3). Each of these items is negatively correlated with all the other items and together form a separate region. Analysis of the stress per point suggested that they add much error to the SSA solution. They seem to refer to variables that have been theoretically proposed to relate to jealousy, e.g., insecure attachment, but that do not appear to relate well to jealousy empirically. A further likely explanation for the misfit is that these items are very ambiguously worded, e.g., *UncomfParty*, rather than only being understood as referring to jealousy could be understood as a measure of social anxiety by someone who does not like to be left alone in situations with novel people, or *GoodExpress* might be understood as a level of discomfort with emotional expression. A decision was made to remove these seven items (marked * in Figure 4, p. 154) from further analyses. Figure 4 shows a partitioning of the revised plot confirming three distinct interpretable regions related to jealousy.

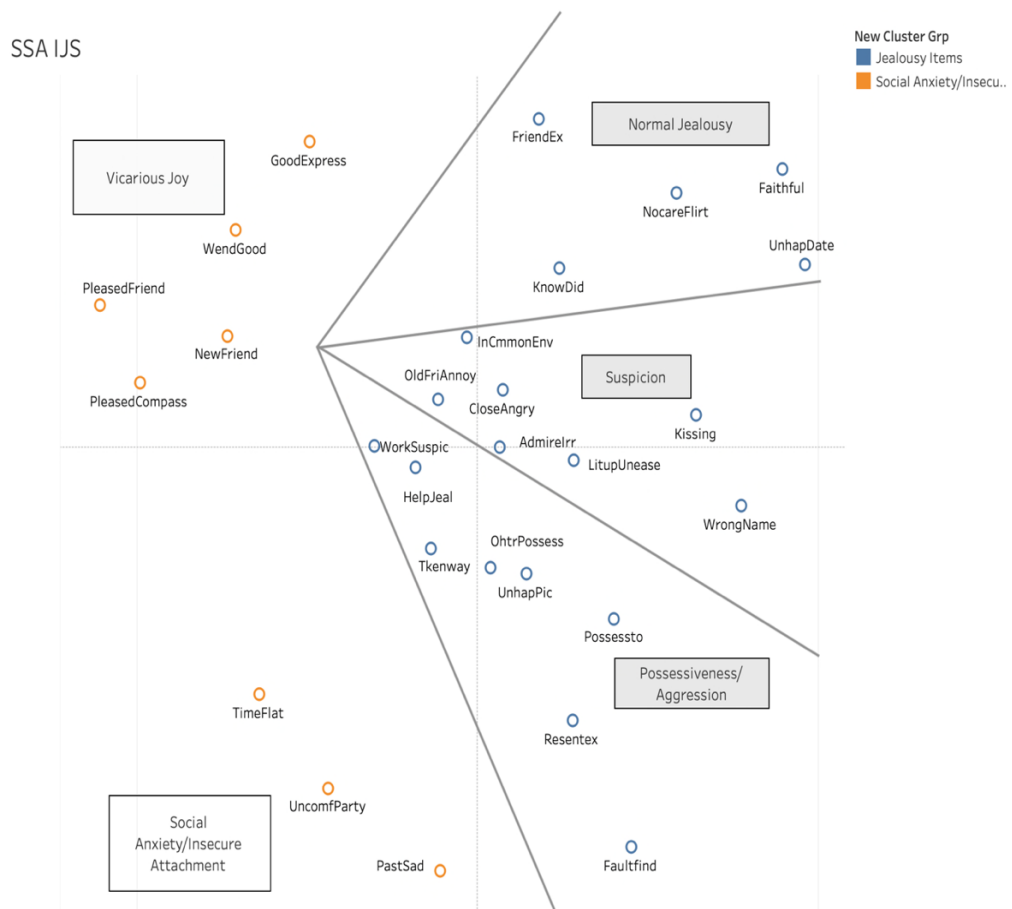


Figure 3. One by two projection of the three-dimensional smallest space analysis (SSA) of IJS scale items.

This shows four regions segmented by lines and elements within each represented by different coloured circles. The upper region relates to items that might be considered normal jealousy. The central region is composed of items that relate to pathology and becomes increasingly pathological as it proceeds clockwise toward the centre right. The left-hand region represents a number of items that appear to represent underlying latent structures unrelated to jealousy.

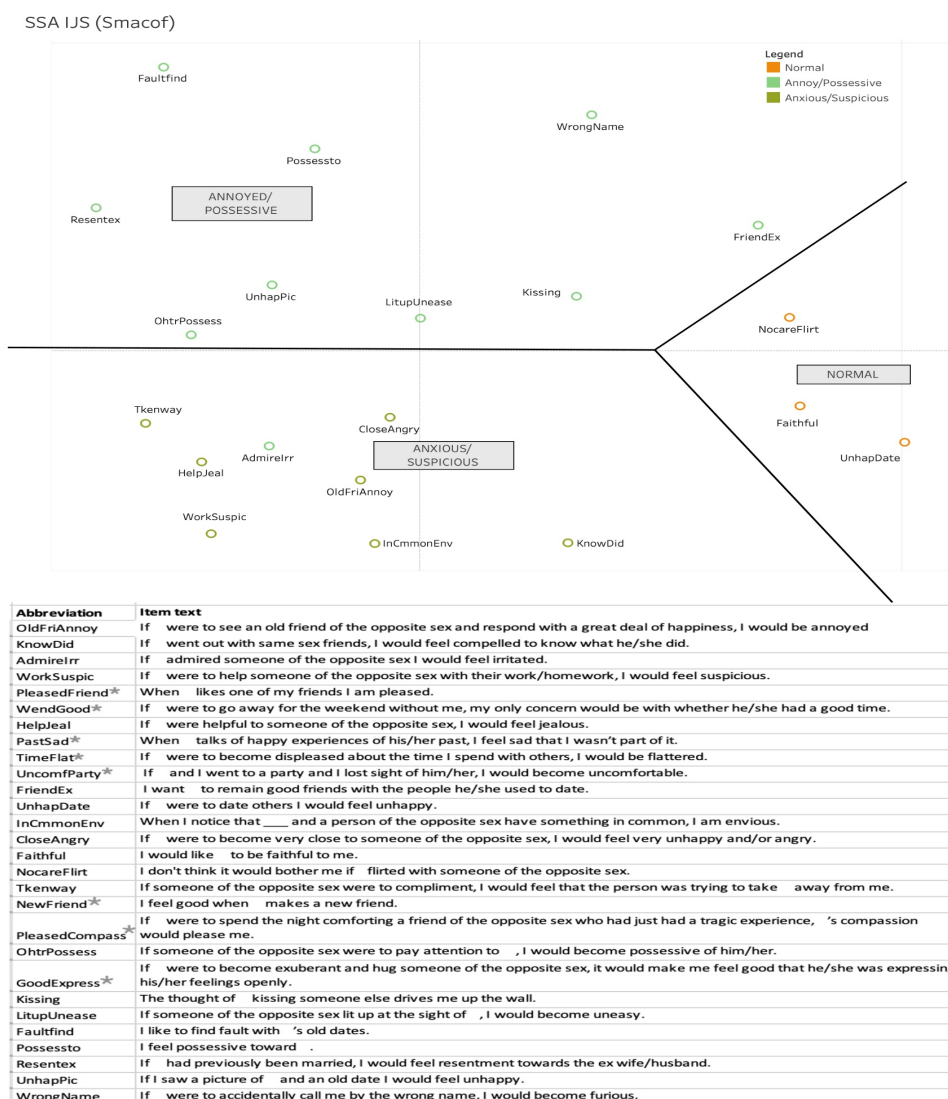


Figure 4. One by two projection of the three-dimensional smallest space analysis (SSA) of IJS scale items (after removal of attachment and pro-relationship behavioural items).

This shows three regions segmented by lines and elements within each represented by different coloured circles. The triangular region to the right is related to items that might be considered normal jealousy. Both other regions are composed of items that relate to pathology. The top region relates to possessiveness and hostility which also appears related to anger. The lower region is related to suspiciousness and is also related to anxiety. The starred items in the item legend relate to items removed from the scale for the subsequent analysis.

The regions shown in Figure 4 are partially ordered and possibly dimensional, reflecting a sequence that relates to feelings, thoughts and behaviours. The first region (three items) relates to *Normal* jealousy experiences —which are items that most

participants would endorse and are sentiments or conditions where most people who desire a monogamous relationship are likely to experience jealousy as a result, and relate to situations where there is substantiated evidence related to infidelity. The second region marked (nine items) *Annoyed/Possess*, can be further understood by exploration of three separate clusters within it. Three items are found in close proximity to the *Normal* region and might be considered, whilst suspicious, to be more normal as they are better evidenced. To the left side of the central region there are six items that relate to either felt anger or protective actions designed to prevent loss of a partner. The adjacent region *Anxious/Suspicious* has eight items which form a cluster related to anxious emotions and suspiciousness. One item, *AdmireIrritated* appears to be misclassified. This item relates to both angry and anxious affect which may be the source of the overlap.

Table 13. Sub-regions within the main regions depicted in Figure 4.

| Dimension | Items |
|--|--|
| <i>Suspicious</i> — near normal (3) | <i>WrongName, Kissing, and Friendex</i> |
| <i>Annoyed/Possessive</i> — anger/protective behaviour (6 items) | <i>Faultfind, Resentex, Possessto, UnhappyPic, OthrPossess, LitupUnease</i> |
| Anxious/suspicious (9) | <i>WorkSuspici, HelpJeal, Tkenway, KnowDid, InCommonEnv, CloseAngry, OldFriAnnoy, Admire Irritated</i> |

The horizontal dimension, shows some ordering with decreasing levels of concrete evidence in support of a jealous response, as the model progresses to the left. In summary, it suggests a scalar structure that is both dimensional and cumulative, which varies according to the concreteness of evidence used and the type of affect experienced. There also appears to be a core dimension related to suspiciousness.

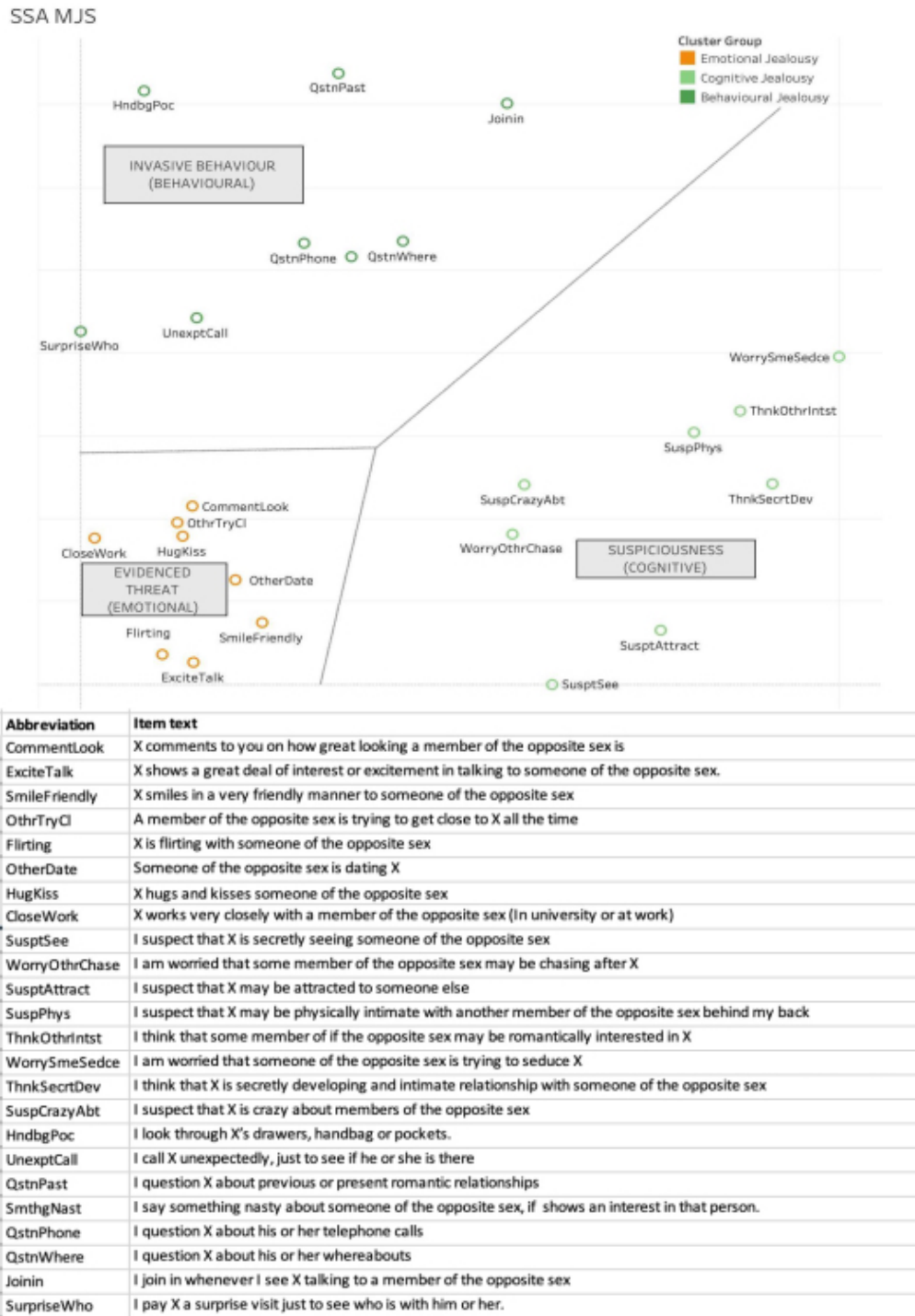


Figure 5. Three-dimensional smallest space analysis plot of MJS scale items.

This shows three distinct regions represented by different coloured circles. Normal/emotional jealousy at the bottom left. An area related to cognitive/suspicious jealousy that starts at the bottom right and becomes increasingly pathological as it ascends toward the top left, and a region related to behaviours associated with jealousy toward the top left.

2. Multidimensional Jealousy Scale (MJS). The Guttman-Lingoes coefficient of alienation for the three-dimensional solution was .19 in 10 iterations. Figure 5 shows

three regions of eight items each related to the scale author's proposed sub-scale structure. Items contained in the emotional region relate to instances with substantiated evidence for a partner's involvement with another, increasingly abstract evidence is used as the basis for a jealous response as the points ascend to the right. The cognitive sub-scale includes items that relate to suspicions about a partner's involvement with another that have little or no basis in concrete evidence. The cognitive sub-scale can be subdivided into separate sub-regions that each contain four items, detailed in Table 14, which relate to *Distress* and *Preoccupation*. The behavioural region is not organised as predicted by the theoretical model and separate detective and protective behavioural clusters could not be identified.

Table 14. Items in the MJS organised by dimension.

| Dimension | Items |
|------------------|---|
| Distress: | <i>SuspectCrazyAbout, WorryOtherChase, SuspectAttract, SusptClose</i> |
| Preoccupation | <i>WorrySmeSeduce, SuspPhys, ThinkOtherIntrst, ThinkSecrtDev</i> |

3. Jealousy: Combined Scales. The Guttman- Lingo coefficient of alienation for a two-dimensional solution was .14 in 20 iterations, indicating a good fit to the spatial representation of the items.

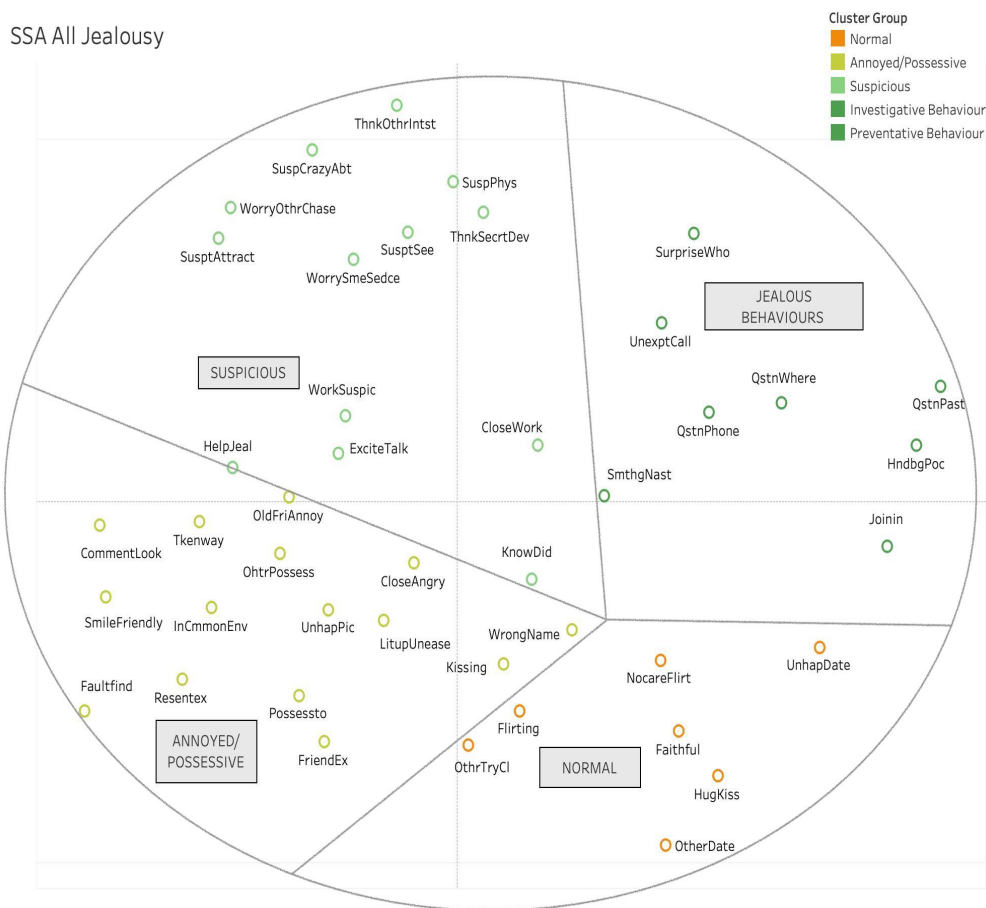


Figure 6. Two-dimensional smallest space analysis of All Jealousy scale items.

(there is a region represented by circles in the bottom right corner that relates to normal jealousy. The outlying circles in the lower left, and upper right and left. quadrants represent items are directly linked to the participants experience. The overall shape indicates that jealousy has a four-dimensional structure. The shape and organisation partially replicate the underlying latent structure found in both the IJS and MJS scales. The IJS has a dimension that relates to possessiveness, hostility and anger that is not measured in the MJS. The MJS has items that relate to suspicious thought and anxiety that is not measured by the IJS.

The scalogram in Figure 6 suggests jealousy’s structure is both cumulative and dimensional. *Normal* jealousy items from both scales lie in the lower right-hand quadrant of the figure as the indicated. The jealousy process then appears to progress through possessiveness and angry responses (lower left quadrant) to increasing anxiety and suspiciousness (upper left quadrant), which in turn, appears to progress to jealous behaviours and threats (in the upper left quadrant). *Jealous behaviours* form a distinct region (upper right quadrant). *Normal* items (i.e., those that reflect jealousy that is

reasonably founded), precede increased negative affect, annoyance and anxiety. These items are also proximal to the regions that reflect suspiciousness. In sum, the plot suggests a progressive escalation of normal jealousy to suspicious jealousy, that is related hierarchically to two types of negative affect: firstly, to anger or annoyance, and then subsequently to anxiety. The pattern culminates in jealous behaviours.

Interestingly, jealousy that relates to past partners is also strongly related to protective behaviours, annoyance and hostility, suggesting that those who are jealous of previous partners may also more likely to engage in protective or hostile behaviours towards the partner. This suggests that jealousy toward past partnerships may be a good indicator of pathology.

Results from Phase Two: Paranoia Scales

3. Paranoia Scale (Fenigstein & Vanable, 1992). The Guttman-Lingoes coefficient of alienation for a two-dimensional solution was .15 in 18 iterations, indicating a reasonable fit to the spatial representation of the items.

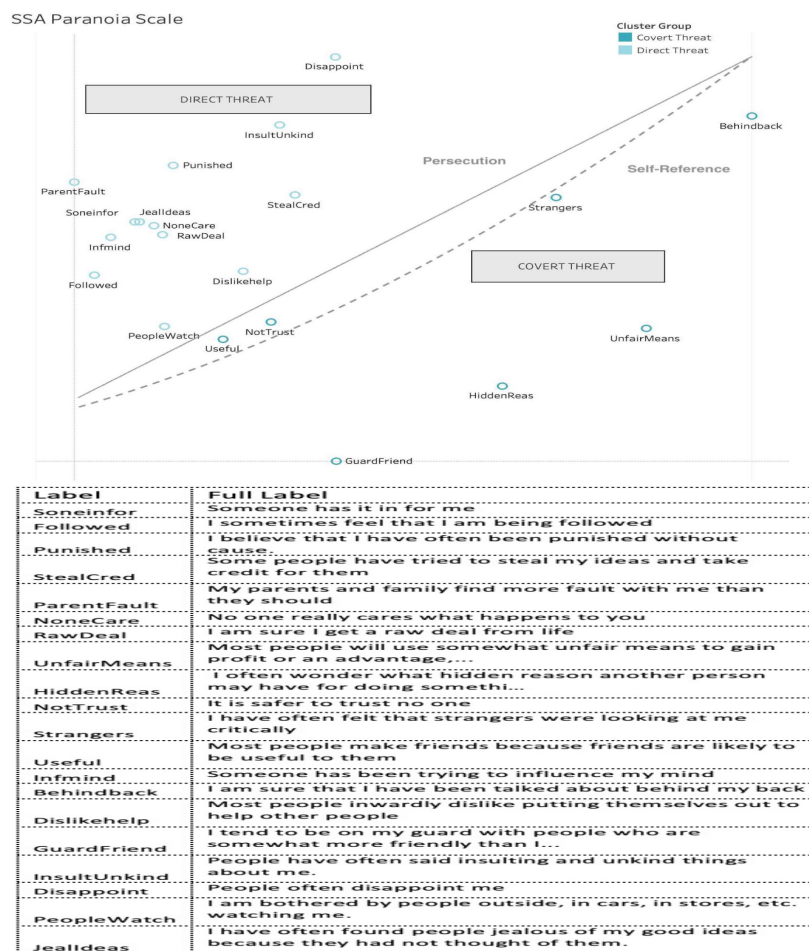


Figure 7. Two-dimensional smallest space analysis of Paranoia Scale items.

This shows a cluster below that relates to people who are not known (strangers or acquaintances) as we move toward the left-hand side of the plot items refer to known people and at the extreme left family are referenced. Clusters appear to relate to the nature of threat experienced with circles in the lower left relating to threats that carry the risk of social exclusion or ostracism. With those on the lower left related to surveillance, and the mid left to lack of care and concern from others. The upper left quadrant represents items linked to physical threats or insults. The dotted line represents the division into self-referent and persecutory ideas.

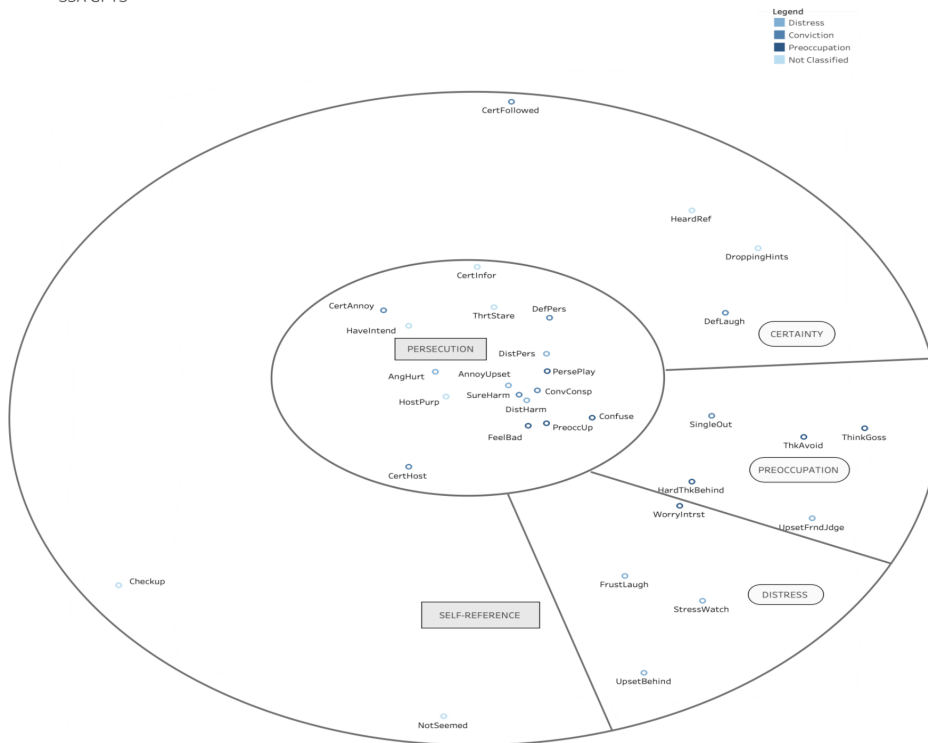
Figure 7 shows the scalogram for the Paranoia Scale (Fenigstein & Venable, 1992), the area is sub-divided into two regions, summarised in Table 15, which relate to the type of threat perceived and whether the threat is thought to be *overt* (a direct threat to safety or of social ostracism) or *covert* (a disguised threat). Direct threats identify a specified group or person, e.g., parents or people who have insulted them, a group of

people or person that the person can identify. Covert threats are threat experiences that are concealed from the person and enacted indirectly, and where a specified group or person cannot be identified.

Table 15. Items in the Paranoia Scale organised by dimension.

| Dimension | Items |
|---------------------------|---|
| Direct threats (11 items) | <i>InsultUnkind, Punished, StealCred, NoneCare, ParentFault, Soneinfor, JealIdeas, RawDeal,, Dislikehelp, Followed, PeopleWatch</i> |
| Covert threats (7 items) | <i>Useful, NotTrust, BehindBack, Strangers, UnfairMeans, HiddenReas, GuardFriend</i> |

4. Green Paranoid Thoughts Scale (G-PTS, Green et al., 2007). The Guttman-Lingoes coefficient of alienation for a three-dimensional solution is .18 in 26 iterations, indicating a reasonable fit to the spatial representation of the items.



| Label | Full Label |
|---------------|--|
| ThinkGoss | I spent time thinking about friends gossiping about me |
| HeardRef | I often heard people referring to me |
| UpsetFrdJdge | I have been upset by friends and colleagues judging me critically |
| DefLaugh | People definitely laughed at me behind my back |
| ThkAvoid | I have been thinking a lot |
| DroppingHints | People have been dropping hints for me |
| NotSeemed | I believed that certain people were not what they seemed |
| UpsetBehind | People talking about me behind my back upset me |
| SingleOut | I was convinced that people were singling me out |
| CertFollowed | I was certain that people have followed me |
| CertHost | I was certain people were hostile towards me personally |
| Checkup | People have been checking up on me |
| StressWatch | I was stressed out by people watching me |
| FrustLaugh | I was frustrated by people laughing at me |
| WorryIntrst | I was worried by people's undue interest in me |
| HardThkBehind | It was hard to stop thinking about people talking about me behind my back |
| CertInfor | Certain individuals have it in for me |
| DefPers | I have definitely been persecuted |
| HaveIntend | People have intended me harm |
| ThrtStare | People wanted me to feel threatened, so they stared at me |
| CertAnnoy | I was sure certain people did things in order to annoy me |
| ConvConsp | I was convinced there was a conspiracy against me |
| SureHarm | I was sure someone wanted to hurt me |
| DistHarm | I was distressed by people wanting to harm me in some way |
| PreocUp | I was preoccupied with thoughts of people trying to upset me deliberately |
| Confuse | I couldn't stop thinking about people wanting to confuse me |
| DistPers | I was distressed by being persecuted |
| AnnoyUpset | I was annoyed because others wanted to deliberately upset me |
| PersePlay | The thought that people were persecuting me played on my mind |
| FeelBad | It was difficult to stop thinking about people wanting to make me feel bad |
| HostPurp | People have been hostile towards me on purpose |
| AngHurt | I was angry that someone wanted to hurt me |

Figure 8. Two-dimensional smallest space analysis plot of G-TPS items.

Contours mark the discrete sub-scales. Movement towards the centroid (central region) appears to indicate increasing pathology, suggesting that persecutory thinking is indicative of greater pathology than self-referencing. Areas within the outer circle are marked into a progressive escalation of symptoms.

Figure 8 shows two distinct, nested, scalar structures indicative of a circumplex

structure (Guttman, 1954) contained within the plot. Each area relates discretely to *self-reference* items (the outer circle) or *persecutory* items (the inner circle) The lack of overlap between items in each scale suggests that there are two related, but discrete, sub-components that comprise paranoid ideation. It also suggests that self-referent and persecutory thoughts are ordered and reflect increasing severity of psychotic symptoms.

The plot shows distinct regions related to the *conviction*, *preoccupation* and *distress* sub-scales, for both the *self-reference* and the *persecutory* sub-scale. The proximity of other items not included in the original, *conviction*, *preoccupation* and *distress* sub-scales, suggests that other items not originally included in those sub-scales may also be related to these dimensions of paranoid ideation. Furthermore, these sub-scales appear to be more clearly defined in the *self-reference* region, suggesting that these concepts may not relate equally to all types of paranoid thought. Items in the centre (*persecution*) are more highly correlated. Therefore, it is more likely that those endorsing of one of these thoughts also endorse other persecutory thoughts.

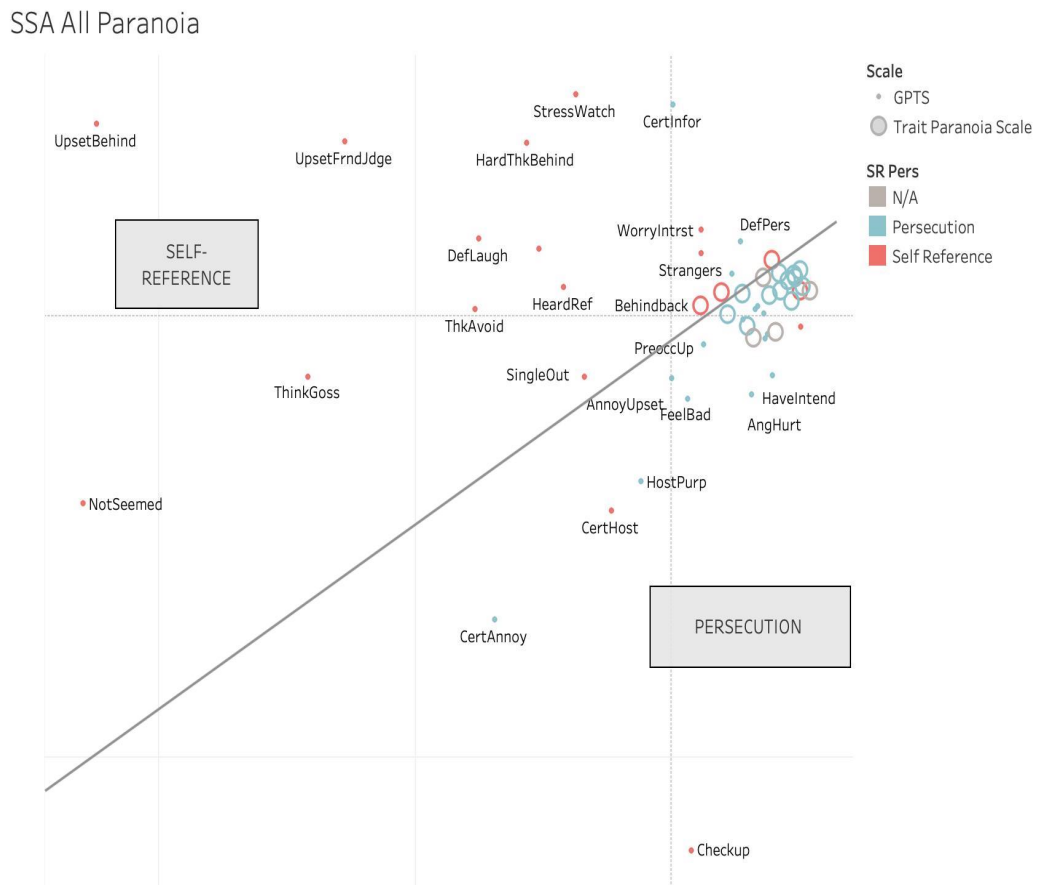


Figure 9. Two-dimensional smallest space analysis plot of combined PS & G-PTS items.

Items related to self-referent thought (in the upper region) and persecutory thought (in the lower region) form distinct regions, for both scales. N/A relates to items in the PS which could not be classified as either self-referent or persecutory. Each scale is represented by different sized dots, to aid identification.

5. Combined paranoia. Stress-1 for a two-dimensional solution is .112 in 168 iterations, indicating a good fit to the spatial representation of the items (Kruskal, 1964). The plot in Figure 9 shows a great deal of overlap in items in the combined paranoia scales. This suggests that items within these scales are measuring the same aspect of paranoia. However, the plot separates into two clear regions. The items present a potentially cumulative structure, whereby less frequently endorsed items are positioned toward the upper left of the plot and more frequently endorsed items in the lower area. This plot shows many redundant items (overlap indicates measurement of the same concept, Kline, 1986). Therefore, for ease of interpretation only the G-PTS items are included in the final solution, as the G-PTS when used alone, appears to measure the

identified sub-components over different intensities and severities (see Figure 9).

Results from Phase Three: Combined Jealousy and Paranoia Scales

The Guttman-Lingoes coefficient of alienation for a three-dimensional solution is .12 in 24 iterations, indicating a good fit to the spatial representation of the items.

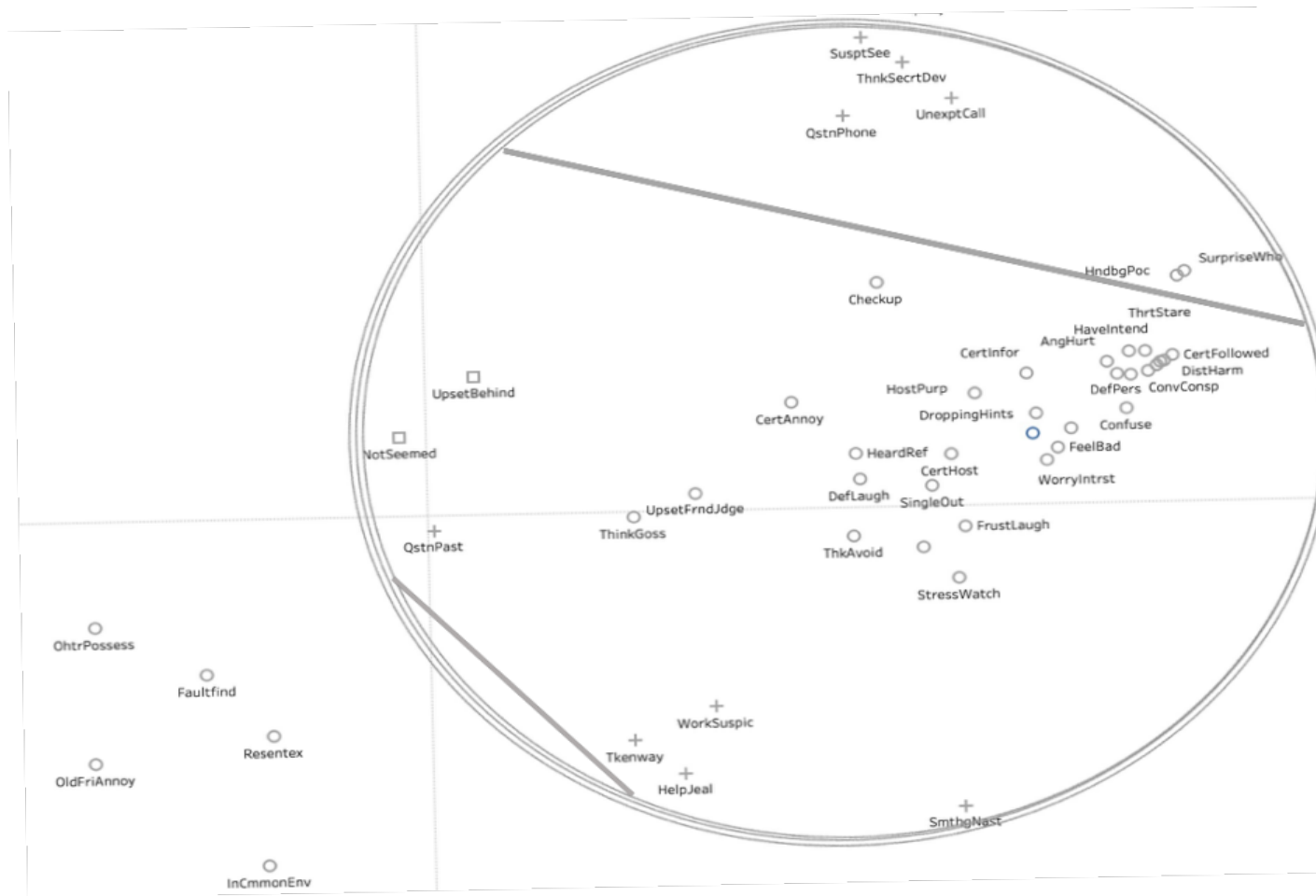


Figure 11. Magnified section of Figure 10, showing detail of suspicious areas of the scalogram where (due to overlap individual items and their labels could not be viewed).

The plot in Figure 10 forms a Guttman ‘*horseshoe*’, indicating a single cumulative dimension that has been compressed into two dimensions (Guttman, 1957). The ‘horseshoe’ is composed of regions of items which indicate a dimensional, cumulative structure. Increases in jealousy are related to both experiences of negative emotion and decreases in the level of evidence. (Figure 11 shows magnified items that are obscured in Figure 10. to allow easier viewing). Each region shown on the plot is described sequentially in greater detail in Table 16. Further explanations of these relationships follow in the next section.

The Process of Jealousy Escalation

A summary of each region, sub-region, and individual item labels are given in Table 16. The first region, *Normal/Mate-guarding*, includes items that relate to jealous expression where there is substantial evidence of infidelity or threat to the relationship. Subsequent regions relate to increasing *Unease*, where there is increasing anxiety and a sense of unease with the partner’s behaviours. *Unease* appears to be based on more minor evidence compared to the prior *Normal* jealousy region. The subsequent area *Annoyed/Possessiveness* is comprised of items which are closely related. Therefore, people who endorse one of these items are also likely to endorse the others and to engage in any related behaviours. The items relate to feelings of annoyance and hostility toward rivals and possessiveness toward the partner. The density of items suggests a close relationship between angry feelings, possessiveness and hostile sentiment. The *Anxious/Suspicious* region contains items related to anxious concerns about a partner’s fidelity, suspiciousness about other’s honesty, perceived threat from a rival’s approach to the partner, or from a mate’s attraction to a rival. The the associated behavioural items representing *protective* actions (Rodriguez et al., 2015) that involve interrogation of the partner or establishing proximity to them in situations where there could be a

potential rival.

The penultimate region *Inquisitive* combines anxiety about partner attraction to others, and threats from potential mates. Items are not related to concrete evidence of infidelity. The other items in this region, relate to *detective behaviours* (Rodriguez et al., 2015) designed to detect or prevent infidelity, e.g., surprise visits in order to ascertain who is with the partner. *Inquisitive* behaviours are closely related and appear in the same dimension. demonstrates a close relationship between self-referent beliefs and protective behaviours. The most closely related paranoid thoughts refer to ostracism, social exclusion, and relate to *preoccupation*—being unable to dismiss upsetting or worry thoughts. There is much overlap between *persecutory* items, which indicates that many of the items in the scale are redundant and therefore should be removed.

Invasive. This region forms a cluster of jealous cognitions and *detective* behaviours, designed to determine if a mate is unfaithful (Rodriguez et al., 2015). The close association indicates that suspicions that a partner is involved in an intimate relationship are likely to co-occur with detective behaviours. Furthermore, these ideas and behaviours represented by these items are more closely related to persecutory ideation, in particular to belief conviction, certainty and surveillance ideas, than to normal mate guarding.

Table 16. Items in each dimension of the combined jealousy and paranoia scale, by sub-dimension.

| Region | Sub-region | Items |
|------------------------------|------------|---|
| <i>Normal/Mate-guarding.</i> | | The first region includes six items <i>OtherDate, HugKiss, Flirting, OtherTryCl, UnhapDate, Faithful</i> that relate to jealous expression where there is substantial evidence of infidelity or threat to the relationship. |
| <i>Unease (4 Items):.</i> | | <i>CommentLook, ExciteTalk, Kissing, NocareFlirt</i> |

| Region | Sub-region | Items |
|--|--|--|
| <i>Annoyed/Possessiveness (12 items)</i> | Annoyed | <i>CloseWork, FriendEx, SmileFriendly, LitupUnease. AdmireIrr, WrongName, CloseAngry</i> |
| | Possessive | <i>Possessto,, OherPossess, ThinkOtherIntrst, UnhapPic, OldFriAnnoy.</i> |
| <i>Anxious/Suspicious, (9 items)</i> | Suspiciousness (5 items) | <i>Resentex, InCommonEn, , SusptAttract, WorryOthrChase, WorrySmeSedce</i> |
| | Protective Actions (4 items) | <i>FaultFind, KnowDid, JoinIn, QstnWhere,</i> |
| <i>Inquisitive(8 Items)</i> | Anxiety and partners attraction to others (1 item) | <i>HelpJeal, WorkSuspic, NotSeemed, UpsetBehind, ThinkGoss,</i> |
| | Threats from potential mates (2 items) | <i>TakenAwy,</i> |
| | Protective behaviours (5 items) | <i>QstnPast,</i> |
| | Self-referential (8 Items) | |
| <i>Invasive (8 items).</i> | <i>Ideas related to partner's serious involvement with a rival.(4 items)</i> | <i>SuspectCrazyAbout, SuspPhys, ThnksecretDev, SusptSee</i> |
| | <i>Detective behaviours (4 items)</i> | <i>QstnPhone, UnexpectedCall, HndbgPoc, SurpriseWho</i> |

Table 16 shows items within each overlapping cluster described in Figures 10 and 11. There was overlap in five clusters where distinct items could not be established in the scalogram. *Cluster 1* consisted of 10 items which all relate to ideational conviction that others are intending harm. *Cluster 2* consisted of two items which both relate to perceived social ridicule and judgement. *Cluster 3* consisted of three items: which all relate to preoccupation with perceived intentions of others to distress the respondent; *Cluster 4* consisted of two items: which both refer to behaviours designed to detect infidelity; *Cluster 5* consisted of two items which both refer to perceived indirect social judgement or surveillance.

| Scale | Cluster # | Items |
|-------|---|--|
| G-PTS | 1. Ideational conviction | SR10– <i>CertFollowed</i> , P2– <i>DefPers</i> , P3– <i>HaveIntend</i> , P4– <i>Stared</i> , P6– <i>ConvConsp</i> , P7– <i>SureHarm</i> , P8– <i>DistHarm</i> , P11– <i>DistPers</i> , P13– <i>PersePlay</i> , P16– <i>AngHurt</i> |
| G-PTS | 2. Perceived social ridicule/judgement | SR2– <i>HeardRef</i> , and SR4– <i>DefLaugh</i> |
| G-PTS | 3. Preoccupation with intention to distress | SR15– <i>WorryIntrst</i> , P9– <i>PreoccUp</i> , P14– <i>FeelBad</i> |
| MJS | 4. Infidelity detection behaviour | Beh 1– <i>HndbgPoc</i> , Beh 8– <i>SurpriseWho</i> , |
| G-PTS | 5. Indirect social judgement/surveillance | SR6– <i>DroppingHints</i> and SR12– <i>Checkup</i> |

N.B. SR refers to the *Self-reference* subscale of the G-PTS. P refers to the *Persecution* subscale of the G-PTS, Beh refers to the *Behavioral* subscale of the MJS.

Patterns of Co-occurrence. The jealousy process evolves clockwise from normal jealousy around the ‘horseshoe’ structure. It is theoretically interesting that the cumulative structure progresses through several discrete negative emotions, this suggests a significant loss of information pertinent to jealousy escalation when measurement clusters negative emotions into a single ‘*negative affect*’ category. Increasing negative emotion such as anxiety, sadness and anger also indicates increasing jealousy escalation. Although, it might be anticipated that anger would relate to more intense jealous responses, the scalograms indicate that increasing anxiety motivates or indicates a more intense response. This follows a cumulative process, with annoyance, preceding discomfort, which then precedes anxiety and inquisitional behaviours. There appear to be clear dimensions of negative affect, and related behaviours. Whereby, worry and increasing anxiety are associated with *overt inquisitional behaviours* e.g., increased questioning. Increasing anxiety is also more related to inquisitional behaviours and the self-reference sub-scale of paranoia. More invasive behaviours are

associated with both increased jealousy and suspiciousness and also increased persecutory thought. More *covert behaviours* e.g., surprise visits and going through drawers or personal property are indicative of high levels of jealousy and more closely related to persecutory ideas.

In summary, there appears to be a discontinuity between normal '*mate guarding*' and pathological jealousy that suggests the escalation of jealousy symptoms via a psychosis-like process. Jealousy appears to escalate via emotional response. Furthermore, it suggests that there is a closer relationship between suspicious thinking in both jealousy and paranoia and that these kinds of jealousy are relatively unrelated to better evidenced kinds of normal/mate guarding jealousy. With the variables related to paranoid ideation and suspiciousness central to the pathological dimensions of jealousy, there is much overlap between cognitive jealousy and suspicious and self-referent aspects of jealousy.

Discussion

Summary

Despite historical attention to jealousy in relation to paranoia (e.g., Freud, 1923), most recent studies and theory have related jealousy to multiple and diverse variables (e.g., Buunk, 1997; Hart, 2013; Marazitti et al., 2010). Chapters 1 and 2 suggested that there may be an association between jealousy and paranoia. The study reported here is the first empirical test to use multidimensional scaling to explore the structure of jealousy and test for a latent dimension that may underlie both jealous and paranoid suspicious thought.

Overall, there is evidence for a normal/pathological divide in the structure of jealousy. There is also evidence that both included jealousy scales replicate a structure

with emotional, cognitive and behavioural components. There is, however, no evidence to suggest that pathological jealousy is subdivided into clear DSM IV-TR (APA, 2000) diagnostic types as Marazitti et al., (2010) suggest. Rather, the process of pathological jealousy follows a continuum, resulting in a pattern of escalating severity that is psychosis-like. Jealousy appears to have a cumulative process, with increases in intensity/severity related to two factors, the level of evidence used to support jealous notions (major, minor evidence, ambiguous cues), and to the type of negative affect experienced.

Furthermore, it appears that the emotional, cognitive and behavioural typological structure of jealousy is likely subject to some misnaming, as many processes revealed in the scalograms as related to suspicious jealousy also involve affect. The process suggested by the current analysis indicates that ‘normal’ jealousy relates to the level of evidence used to form a judgement and not the relationship to emotion; and the cognitive and behavioural subtypes form distinct clusters of *both* thought and related behaviour, and indicate increasing preoccupation and suspiciousness, which eventually materialises in action (behaviour). This process is phased, and relates to distinct clusters which comprise cognitive, behaviour, and emotional components, and which relate to different emotions. The process originates in normal jealousy which appears to be a normative response to well-evidenced relationship threat. More minor evidence of relationship threat is related to both possessiveness and feelings of annoyance. However, subsequent increases in jealousy are related less to annoyance, anger or possessiveness but to increased anxiety, suspiciousness, and increasingly pathological behaviours.

The scalograms show that the IJS and MJS scales have varying coverage of the

jealousy and paranoia space and cover different aspects of jealousy. In conclusion, the jealousy space is not represented fully by either scale alone. In particular the IJS does not measure behavioural aspects of jealousy well. Whereas, the MJS does not measure annoyed/possessive/hostile aspects of jealousy well. Both scales alone are somewhat indicative of a cumulative structure revealed by the MDS plots, however the MJS appears to more effectively scale jealousy. These findings will be discussed in relation to theory in subsequent paragraphs.

The G-PTS reflects the theorised structure of paranoia suggested by Green et al. (2008) with two distinct regions related to persecution and self-reference which are also hierarchically ordered, and have distinct clusters related to *preoccupation*, *distress* and *certainty*. However, the regions related to the preoccupation, distress and certainty, only appear to relate clearly to self-referent ideation. Three regions of the combined jealousy and paranoia structure relate to paranoid ideation. *Anxiety* is related to increasing suspiciousness. *Inquisitiveness* is closely related to self-referent ideas, preoccupation and distress and 'preventative' behaviours. Finally, *Invasiveness* is more related to persecutory ideation, surveillance, certainty and to 'detective' behaviours.

Finally, and most importantly, the proximity and overlap of items within the paranoia scales with suspicious and pathological jealousy items suggests a relationship between suspiciousness in both jealousy and paranoia. The identification of this distinct suspicious sub-space, comprised of items from both the jealousy and paranoia scales, suggests that the paranoia and jealousy scales measure a similar underlying construct, namely a single latent psychotic dimension with two sub-divided main dimensions. In sum, this suggests that suspicious pathological jealousy is more closely related to paranoid ideation than it is to normal jealousy. The relationship of these findings is

related to theory and prior research in the following paragraphs and suggestions are made for further research.

The Structure of Jealousy

The results support a multifaceted notion of jealousy that has four, dimensional facets evolving from a distinct normal kind of jealousy. This contrasts with notions of unidimensional (Mathes & Severa, 1982), three (Barelds & Dijkstra, 2007; Pfeiffer & Wong, 1989), or five factor solutions (Marazitti et al., 2010). In contrast with factor analyses of jealousy (Lima et al., 2017; Marazitti et al., 2010) there is no evidence for a five-factor solution or distinct regions in the jealousy space that relate to other psychopathology such as obsessiveness or depression.

The findings presented here suggest that normal jealousy results from direct relationship threats, e.g., a partner who is dating others or who shows clear interest in becoming involved with someone else and reflects an innate preference for a faithful or monogamous partner (see Buss et al., 1992; White & Mullen, 1991). Normal jealousy therefore has much in common with normal mate-guarding behaviour (Buss et al., 1992).

The process described follows a circumplex structure, as do other kinds of affect (Russell, 1980), which suggests that normal jealousy, rather than having different types that relate to either emotion, cognition or behaviour, is a basic motivation that becomes distorted by specific affective (i.e., anger and anxiety) and cognitive processes (i.e., suspiciousness). Secondly, severity is not determined by its relationship to either emotion, cognition or behaviour, but these three aspects of personality form complexes that define stages of escalating jealousy.

The unique findings here are that it appears to be two variables only; the level

of evidence used, and the specific negative emotion experienced that drive the pathological escalation of jealousy. In line with Bringle (1991), findings suggest that increases in pathology are related to the use of increasingly ambiguous cues and evidence to support jealous ideas. Also, there is a sequenced relationship between the types of negative affect and jealousy escalation; first anger and aggression are implicated, followed by anxiety which is related to further increases.

Psychometric Properties of the Scales.

Both jealousy scales explored have some consistencies in their structure, with regions related to Pfeiffer and Wong's (1989) original factor structure: *emotional*, *cognitive* and *behavioral* jealousy. However, whereas the MJS was designed to measure multidimensional jealousy as defined by Mullen and Maack (1985) i.e. that emotion, cognition and behaviour do not constitute discrete factors, but are aspects of jealousy. The original intention of Mullen and Maack (1985), was for the development of a multidimensional measure that included emotion, cognition and behaviours. Pfeiffer and Wong (1989) appear to have mislabelled the *emotional* sub-scale, which might have been better labelled reactive jealousy as it relates more to a person's response to the level of evidence than to the jealousy's basis in an emotional response. The findings presented here appear to be better aligned with Mullen and Maack's (1985) original theoretical notion, than with Pfeiffer and Wong's (1989) suggested structure. Whereby, jealousy types form complexes of related emotion, cognition and behaviour that should be included in measures, rather than being viewed as discrete components. The results here suggest that emotion is pervasive and that different emotional sub-types cannot be identified.

Additionally, there is a sparsely populated region of the combined plot, with a

single point related to sad affect. Theory suggests that there is a relationship between sad and depressed affect and jealousy. Therefore, items related to sad affect appear to be omitted from both jealousy scales. The scales also contain no behavioural items related to normal and few related to possessive jealousy which theory suggests should be included. In summary, neither scale adequately measures the structure of jealousy suggested by the results, and they should be revised to include items that measure sad/depressed affect, and possessive and normal jealousy behaviours.

The Relationship of Jealousy to Paranoia

The structure of paranoia hypothesised by Green et al. (2008) is reproduced in the current analysis; more respondents in this student population sample endorse self-referent items, and fewer endorse persecution items, suggesting that persecutory items indicate more severe paranoia. In addition, the findings suggest that suspicious jealousy may share a close relationship to paranoia and have a latent psychosis-like process. It appears likely that the specific content of thoughts i.e., paranoid or jealous ideas, may be less important to the escalation process, than the type of evidence (i.e., major, minor, or ambiguous cues) used to support the jealous belief. The relationship of the most severe jealousy thoughts and behaviours to the G-PTS *belief certainty* sub-scale supports this claim. Belief certainty has been found to relate to the onset and maintenance of paranoid ideas (Garety & Freeman, 1999) and the findings here suggest that this may also be the case for more severely jealousy ideation. Furthermore, greater severity in jealous ideation and behaviour (as suggested by frequency of item endorsement) is related to endorsement of those G-PTS scale items that indicate more severe paranoid ideation (Freeman et al., 2019).

The contribution of anxiety to the jealousy escalation process parallels that

suggested to result in paranoid escalation (Freeman et al., 2002), giving reasonable support to the notion that, like increases in anxiety causing increased paranoid ideation (Bennett & Corcoran, 2010), this may also be the case for jealous ideation. The process outlined here, suggests that this due to raised levels of general anxiety. In cases of paranoia it is suggested that individuals misattribute increased anxiety to external causes, leading to an escalation of paranoia, increased distress, preoccupation and greater certainty (Freeman, Garety, & Kuipers, 2001). The findings here suggest that this may also be the case for jealousy. Further support for an anxiety-driven process underlying suspicious jealousy is that, like paranoia (Freeman et al., 2001), both anxiety and suspiciousness increase in parallel, and escalation results in increased distress and preoccupation.

Although these findings are tentative, the clinical implications of this research are that jealous pathology may benefit from treatments that have been found suitable for reduction of psychosis, for example anxiety reduction (Freeman et al., 2015) and sleep pattern regulation (Freeman et al., 2017). One area where this might prove useful is in relation to intimate partner abuse, where jealousy is often problematic but is often not treated in relation to mental ill-health or specifically, as suggested here, to increased psychosis-like symptoms (for a review of treatment approaches see Arias, Arce, & Villariño, 2013). Treatment as such, might prove useful in improving outcomes in jealousy-related intimate partner abuse.

There are several limitations to the current research. Although the sample size was adequate, it comprised mainly females who are suggested to have less severe jealousy pathologies (Daly & Wilson, 1982, 1988). However, in this dataset both genders endorsed *severe* items on each jealous and paranoia scale, which suggests that

the variance in responses is adequate for effective model building (Henricksson & Wolming, 1998; Hunter & Schmitt, 1990). However, comparison of the findings with a more gender representative sample might be justified. Furthermore, a stratified sample including clinical and forensic populations would give more information about the more pathological extreme of the jealousy structure as it relates to increased paranoia. A further limitation is that these findings are tentative and require replication. Although the two scales used had the best psychometric properties of currently existing scales and represent the core psychological domains of cognition, affect and behaviour; as previously discussed, (see p. 174–5), there are several omissions and weaknesses in the scales used and they would benefit from further revision. Therefore, an item-response theory approach should be used to improve current jealousy scales. Furthermore, although MDS techniques can indicate a cumulative structure (Borg, Groenen, & Mair, 2013) this requires additional testing to confirm i.e., the use of item response theory techniques (see Hambleton, Swaminathan, & Rogers, 1991); and research designs that can capture cause and effect processes. Finally, further experimental or in-depth research should further explore the suggested psychosis-like process and mechanisms *in-vivo*.

Conclusion

Chapter Four aimed to explore the latent structure of jealousy, the interrelationship of its dimensions, and its relationship to paranoia. It also explored the adequacy, psychometric properties, and overlap between a number of measurement scales, in order to further explore the relationship between jealousy and paranoia. The findings suggest that it is possible to distinguish normal from pathological jealousy on the basis of the level of evidence used to justify jealousy and its emotional content. In addition, the findings suggest that jealousy has a cumulative and dimensional structure

that is related to psychotic-like symptoms. The following chapter continues the systematic empirical investigation of jealousy by exploring further the latent cumulative structure suggested in this chapter.

CHAPTER 5. DO JEALOUSY AND PARANOIA GO TOGETHER? AN ITEM RESPONSE THEORY ANALYSIS OF THE RELATIONSHIP BETWEEN JEALOUSY AND PARANOID THINKING

This chapter using the same data as Chapter 4 builds on the analyses in that chapter to further explore the suggested cumulative nature of both paranoia and jealousy as indicated by the multidimensional scaling analysis (MDS). The structural analyses described in the previous chapter suggest that jealousy may be conceptualized as a continuum, and additionally that there may be considerable overlap between paranoid ideation and more pathological forms of jealousy.

As discussed in Chapters 2 and 3, jealousy has largely been treated as a categorical latent construct (e.g., Buunk & Dijkstra, 2006; Marazitti et al., 2010; Pfeiffer & Wong, 1989); however, recent suggestions (Lima et al., 2017) are that it may be continuous in nature. MDS analyses in the previous chapter indicate a range of facets which collectively explain the phenomenon. However, MDS analyses alone cannot say whether or not they collectively form a hierarchical or superordinate dimension. In the same way that psychopathy comprises a set of factors which are both dimensional (Bishopp & Hare, 2008) and can be considered within a superordinate cumulative dimension (Bolt, Hare, Vitale, & Newman, 2004). Pathological jealousy might be viewed in a very similar way, albeit with a different set of personality facets, and has been examined here within a similar methodological approach. Additionally, the previous chapters, Two, Three and Four suggested there may be considerable overlap between paranoid ideation and more pathological forms of jealousy. This chapter aims to test these assumptions using item response theory .

As stated in previous chapters, jealousy is frequent in the general population, with around 40% of community respondents indicating having had some kind of

unfounded suspicion about their partner's fidelity (Mullen, 1991), and often associated with partner aggression, controlling and coercive behaviours (Dutton et al., 1996). There is current uncertainty in what underlies jealousy in pathological conditions, and whether pathological jealousy is a distinct type of jealousy or whether it is a heightened form of normal jealousy. On the other hand, paranoia is treated as a distinct construct, but as described in Chapters 2 and 3, it appears to display considerable overlap with jealousy, that might be indicative of a shared underlying process. In order to identify the precursors to and outcomes associated with problematic jealousy, an understanding of the constructs underlying it is essential, as well as the relationship of normal to pathological jealousy and its overlap with paranoia.

Jealousy is frequently described as an emotion (Sharpsteen, 1993), or a combination of emotion, thought and behaviours (Mullen, 1991). Furthermore, there is great disagreement about how many dimensions it consists of, with variation between a single dimension and over six dimensions, (see Bringle, 1991; Rydell & Bringle, 2007). It seems reasonable to conclude that despite efforts at achieving effective operational definitions and measurement there is still a great deal of disagreement about what jealousy is and how it is structured. On the other hand, paranoia is generally better described in terms in terms of abnormality and mental ill-health, where the sufferer has unsubstantiated suspicions about other's intentions (Bentall et al., 2009) and there is also substantial evidence that it exists on a continuum within the population (Johns et al., 2004). We might, on the basis of these notions expect jealousy and paranoia to have very different structures. However, despite the structure for jealousy that the previous literature would predict, it appears likely on the basis of the evidence collated in Chapter 2 and the findings of Chapter 4 that jealousy will be structured similarly to paranoia, and furthermore show significant overlap with paranoid thought.

Although classification and psychometric assessment tools are available for both paranoia and jealousy (e.g., Green et al., 2008; Pfeiffer & Wong, 1989). The definition and distinction between the two constructs is unclear. Chapters 2, 3 and 4 indicated that the true character of jealousy may include an overlap with paranoia. Specifically, suspicious jealousy may indicate the presence of an underlying latent psychotic process, underpinning both paranoia and suspicious jealousy. Although functional definitions of paranoia include distorted thinking about both potential harm to the self and jealousy (Bentall, 2003), jealousy is frequently only measured as a single item on paranoia scales. For example, the Paranoia/Suspiciousness Questionnaire (Rawlings & Freeman, 1996) has one item '*Are you sometimes eaten up with jealousy?*'. As a result, it is unclear whether some types of jealousy might be classified as a type of paranoid ideation. As Freeman (2007) points out in his extensive review of the field, there is a tendency to ignore the multidimensionality of the experience of paranoia and a failure to define the phenomena in detail. Also, by examining these constructs together, a more comprehensive set of elements can be determined from which to theorise. A method which would enable this analysis is item response theory (IRT).

Item response theory is the name of a set of mathematical models, which include Rasch Analysis, that are used to create scalar measures from ordinal measures. These models estimate of ability (or severity) are independent of the sample characteristics (Lord & Novick, 1968). Rasch models were originally designed for use with dichotomous data, but the models have been extended to polytomous data (e.g., Andrich, 1978; Masters, 1982). Rasch analysis differs from other polytomous item response models, as only single parameter difficulty, is modelled. Granger (2007) summarises Rasch analysis as a unique mathematical modelling approach to measurement of a latent trait, that involves generating linear estimates of true intervals

of item difficulty and person ability. Rasch analysis is used to transform ordinal scales into interval measures that can be used in parametric statistical analysis. Using the statistics generated by the model it is possible to decide whether any measurement item should be deleted, rescored or reworded. It also enables decisions to be made about cut-points and sufficient items to be included in a scale. Rasch analysis makes the assumption that the amount of a person's skill or attribute, (θ), and difficulty or easiness of any item that measures this skill can be positioned relative to each other and therefore measured on a shared latent continuum using a probability model. It further assumes that the relative positions of these are invariant (other than any included error) as they constitute genuine scalar measurement. Much the same way as we can measure the relative temperature of something in degrees Kelvin. Rasch analysis allows rating of a reduced set of attributes that represent the underlying trait. Unlike, classical test methodology, the more usual type of scaling used in psychology in particular, it does so in such a way that the sum of these measures represents how much of that trait has been measured. Given disagreement about the structure of jealousy, the understanding of any latent processes underlying jealousy, and a lack of understanding of which items in jealousy scales in general, and the jealousy scales used here in particular, indicate lesser or greater intensity, IRT is well suited to provide information that is not available via classical test theory measurement (de Alaya, 2009). Given the sample variation in both jealousy and paranoia studies which span, forensic, clinical and general population samples the psychometric properties of Rasch-based IRT solutions are particularly useful in measuring across samples as the method produces measurement that is scalar and both item and person invariant.

The Current Study

Whilst previous analyses have clarified the range of possible constructs. This

chapter hopes to further clarify the nature and underlying structure of jealousy, using item response theory, which can lend support for whether, or not, these constructs form a cumulative structure. An understanding was sought of jealousy in relation to its conceptual proximity to paranoid ideation in order to clarify whether this suggests an underlying latent process that might explain similarities in both behaviour and cognition between pathological jealousy and paranoia. Secondly, the current research sought to explore the cumulative nature of jealousy suggested by the MDS analysis. In particular, to explore the suggested overlap between paranoid ideation and jealousy. A sub-aim of this exploration was to determine if a more comprehensive, yet parsimonious jealousy scale was suggested upon analysis of the included rating scales.

Method

The sample, the measures used, the administration procedure, and the data for this study are the same as those used in the previous chapter.

Measures

1. Paranoia.

The Green Paranoid Thoughts Scale (G-PTS; Green et al., 2007), is a self-administered questionnaire with two sub-scales each of 16 items. Part A measures ideas of social reference —mild social concerns, and Part B ideas of persecution —beliefs concerning mild, moderate and severe threat (Cronbach's $\alpha = .90$ in clinical samples; $= .95$ in non-clinical samples; test-retest reliability, ICC coefficients of .83) and they also show convergent validity in both clinical and non-clinical samples. Higher scores indicate higher levels of paranoid thinking.

The Trait Paranoia Scale (PS; Fenigstein & Vanable, 1992) is a 20-item self-report Paranoia Scale developed for a university population and includes items that

assess both ideas of self-reference and persecution. Items are rated on a 5-point scale (1-5), with overall scores ranging from 20 to 100. Higher scores indicate higher levels of paranoid ideation.

2. Jealousy.

The Interpersonal Jealousy Scale (IJS; Mathes, Phillips, Skowran, & Dick, 1982; Mathes & Severa, 1981) is a self-administered 28-item scale that measures romantic jealousy.

The Multidimensional Jealousy Scale (MJS; Pfeiffer & Wong, 1989) is a 24-item self-administered questionnaire developed for use within the general population. It has three sub-scales: cognitive jealousy, which refers to participant worries and suspicions regarding partner infidelity; emotional jealousy, which refers to negative emotions in response to a perceived threat to a romantic relationship; and behavioural jealousy, the investigative or protective actions a person takes in order to minimise or eliminate a perceived threat of either real or imaginary relationship rivals. Across five studies, the scale was found to be stable and reliable, with very good internal consistency (Cronbach's α ranges .83–.92) (Elphinson, Feeney, & Noller, 2011; Lucas, Pereira, & Esgalhardo, 2012; Pfeiffer & Wong, 1989).

Procedure

1. IRT and the Rating Scale Model. IRT is a statistical framework for modelling items from either interval level data or ordinal models with some form of monotonicity (Hambleton, Swaminathan, & Rogers, 1991). A specific model that is theoretically suited for scales that use discrete categories scored using multiple responses e.g., Likert Scales, but where response categories also differ between items, is the Partial Credit Model (PCM; Masters, 1982). The PCM provides response estimates

per item and estimation of person parameters.

2. Assessing PCM Fit. Various methods have been suggested for the assessment of fit in IRT models. Despite no perfect solution having been found, several of the proposed indices have been found useful for model evaluation (Anderson, Li, & Vermunt, 2007). All basic IRT models assume unidimensionality of the latent structure, which was tested in the previous chapter using MDS modelling. Rasch models also assume the invariance of trait (θ) and item (a_1, b_1) parameter estimates. Hambleton et al. (1991, p.64) suggest that it is possible to provide an approximation of these by comparison of the parameter estimates of odd and even, and male and female items in each scale. If the model assumptions are not violated it is possible to compare the predicted and actual estimates (Drasgow et al., 1985) using the robust, *ZL* statistic developed by Drasgow et al. (1985) to estimate person and item fit.

3. Analytic procedure. Analyses were carried out using *SPSS version 24* (IBM, 2016) and *R* software, 3.5.2 (2018-12-20) —"*Eggshell Igloo*", using the *eRM package developed for extended Rasch modelling in R* (Mair & Hatzinger, 2007), which uses a Conditional Maximum Likelihood Model. Questionnaire Items were coded according to the guidelines in the original psychometric test manual or the original paper. Categories of the original IJS were collapsed from the original nine to five equally explanatory categories to facilitate interpretation.

Results

Choice of Model

A number of different item response models are available, which are suited to different types of data (Rasch, 1966). The choice of a model which uses a mathematical

function appropriate to the data is important. For the individual scales either the Rating Scale Model (RSM; Andrich, 1978) or the partial credit model (PCM; Masters, 1982) was fitted, as they are both one parameter models (Rasch models) suitable for polytomous data. The RSM model was fitted where possible, as it provides invariant category boundaries within a scale, allowing assessment of the appropriateness of response category ordering within the Likert Scale (Andrich, 1978). One of the scales (the Interpersonal Jealousy Scale) had incomplete responses for some scale item categories; therefore, the PCM was fitted for this scale. Items were eliminated from each individual scale to provide a combined model. Each of the scales described has a polytomous response format (Likert Scale). As the individual scales in the combined analysis had varying numbers of response category, the RSM could not be fitted. Therefore, an alternative Rasch model, the partial credit model (PCM) suitable for both ordinal rating scales and varying category responses was fitted (Masters, 1982) for the combined scales. Person and item parameters were specified as follows: *Severity* (attribute location on a unidimensional scale, β_1), *Significance* (probability of each item misfit); *Infit and Outfit* are reported in Table 18. Items are presented in ascending *Severity* order in Figure 12, with item reversals also indicated. Items which do not fit the latent structure are discussed below and an improved model (*Model 2*) was fitted as suggested by the Infit and Outfit statistics obtained from *Model 1*. *Models 1* and *2* were compared using their respective *Goodness of Fit* indices (see Table 22).

Descriptive Analyses and Sample Characteristics

The sample characteristics and descriptive analyses are reported in the previous chapter, Chapter 4.

The Rasch Analysis.

1. Estimation and elimination from individual scales. (N.B. Items are referred to in the text with the name of the scale and the item number, e.g., *Interpersonal Jealousy Scale, Item 4* becomes *IJS4*)

The 24 item MJS is considered a single scale, with three subscales. A total of seven items show significant *Outfit*. Two items have *Outfit* statistics that indicated they should be eliminated (either the Mean Square (above 1.3) or *t* statistic (outside ± 1.96). Five items have significant *Infit* and should be eliminated due to their lack of reliable discrimination (Mean Square less than 0.5, or *t* statistic outside ± 1.96).

The 28-item IJS is considered a single scale. A total of twelve items show significant *Misfit*. Eleven items show significant *Outfit*, suggesting that they are also measuring other extraneous factors unrelated to the latent trait and are significantly more varied than expected, indicating that they measure something other than the latent variable. One item has too little variability (*Infit*) and therefore provides little useful information related to the latent variable.

The 32 G-PTS items are considered as a single scale, consisting of two subscales. A total of 11 of the 32 items from the G-PTS show statistically significant *Misfit*. Values greater than 1.3 indicate item responses are more varied than the model predicts, suggesting that these items other extraneous factors are confounding responses that are not related to the latent trait that the item is proposed to measure. Appendix F shows the fit for all MJS, IJS and G-PTS items from the individual scales.

Too little variation is indicated by responses that are less than 0.5 logits and these items are significantly less variable than the model predicts. These items provide

little useful information about a respondent's relative position on the latent variable.

Table 18. Detail of item *Misfit* by scale.

| Scale | Statistic | Item # and Short Label |
|-------|-----------|--|
| MJS | Infit | Cog 1– <i>SuspectSee</i> , Cog3– <i>SuspAttract</i> , Cog4– <i>SuspPhys</i> , Cog6– <i>WorrySmeSedce</i> , Cog7– <i>ThinkSecrtDev</i> |
| | Outfit | Cog8– <i>SuspCrazyAbt</i> & Beh7– <i>Joinin</i> , |
| IJS | Infit | IJS14– <i>UnhapDate</i> |
| | Outfit | IJS 3– <i>AdmireIrr</i> , IJS5– <i>PleasedFriend</i> , IJS7– <i>WendGood</i> , IJS12– <i>HelpJeal</i> , , IJS15– <i>CloseAngry</i> , IJS16– <i>NocareFlirt</i> , IJS17– <i>Tkenaway</i> , IJS19– <i>PleasedCompass</i> , IJS20– <i>OthrPossess</i> , IJS23– <i>LitupUnease</i> , and IJS28– <i>WrongName</i> , |
| G-PTS | Infit | P6– <i>ConvConsp</i> , P7– <i>SureHarm</i> , P8– <i>DistHarm</i> , P9– <i>PreoccUp</i> , P12– <i>AnnoyUpset</i> , P13– <i>PersePlay</i> . |
| | Outfit | SR7– <i>NotSeemed</i> , SR10– <i>CertFollowed</i> , SR12– <i>Checkup</i> , SR15– <i>WorryIntrst</i> ; P3– <i>HaveIntend</i> |

2. Estimation from the combined scale. The three scales initially provided 84 items. Eight items from the IJS that had been eliminated for the MDS analysis in Chapter 4, due to poor fit with the structure, were also eliminated the current Rasch analysis (see Chapter 4: *IJS5R–Pleased Friend*, *IJS6R–WendGood*, *IJS8–Past Sad*, *IJS9–TimeFlat*, *IJS10–UncomfParty*, *IJS18R–NewFriend*, *IJS19R–PleasedCompass*, *IJS21RGoodExpress*). In addition to *Misfit*, these items were eliminated as they seemed likely to be endorsed by respondents differently; whilst some responders may endorse an item in relation to their jealousy, others may be responding to a different, related but distinct phenomenon that the items also appear to measure, e.g., pro-relationship behaviours, secure attachment, and social anxiety.

A logical next step in polytomous item analysis is to assess whether categories are used in the same way as intended during scale design (Andrich, 1978). This

assessment revealed that many of the thresholds in each ordinal scale were misordered/reversed. This suggests that the response design is not congruent with the authors theoretical intention. Table 18. shows the thresholds (in logits) between categories, the thresholds suggest that overall the categories increase monotonically, but that scale categories should be collapsed.

Full descriptions of individual scale items, and the *Misfit* for individual scales are provided in Appendices D and E. *Misfit* statistics are standardised normal variables with an anticipated score of 0, these statistics are used to test hypotheses about item fit to the model. Inspection of the *Misfit* statistics produced by the *PCM* analyses of the remaining items for each individual scale indicated many items that did not fit the latent dimension well.

Further visual inspection of the MDS scalogram and the correlation matrix for the combined IJS, MJS and G-PTS scales, revealed a number of items occupying the same dimensional space. Overlap in the MDS scalogram indicates that items measure the same aspect of the latent variable and are therefore redundant (Kline, 1999).

Initial item elimination, as described above, resulted in 42 retained items that were input to the full model. Item parameter estimates in Table 19. include the difficulty parameter (βI), the *Outfit* index (Mean Square), *Infit* (Mean Square) and a probability of *Misfit* index (*t*-square statistic of Mean Square). Items in the table are ordered according to severity of the latent variable (βI). As seen in Table 19, positive values indicate a greater severity, whereas negative values indicate a lower severity. Items marked in bold have significant *Misfit* (as evidenced by *Outfit* values less than 0.7 or greater than 1.3, or *t* statistic values that fall outside ± 1.96 (Wright & Linacre, 1994). Overall Scale Properties are good. However, the *Anderson LR* (Anderson, 1973) is

significant (LR value = 1.48 (96), $p=0.001$), which indicates items predict differently for subgroups.

Table 19. Fitting the IRT model to jealousy and paranoia scale items.

| Item Name | Short Label | MDS Category | Frequency | β_1 | Outfit | Infit | p |
|------------|-------------------|--------------|-----------|-----------|--------|-------|-------|
| MJS_Emo6 | OtherDate | 1 | 95.6 | -1.11122 | 0.997 | 1.035 | 0.485 |
| MJS_Emo7 | HugKiss | 1 | 89.6 | -1.04405 | 1.019 | 1.007 | 0.388 |
| MJS_Emo5 | Flirting | 1 | 95.6 | -0.97113 | 0.95 | 0.953 | 0.689 |
| MJS_Emo4 | OthrTryCl | 1 | 94.8 | -0.80882 | 0.931 | 0.962 | 0.764 |
| MJS_Emo1 | CommentLook | 2 | 63.2 | -0.52765 | 0.993 | 0.961 | 0.501 |
| MJS_Emo2 | ExciteTalk | 2 | 71.6 | -0.46833 | 0.896 | 0.908 | 0.87 |
| IJS_13 | InCmmonEnv | 4 | 73.2 | -0.46308 | 1.234 | 1.161 | 0.006 |
| IJS_25 | Possessto | 3 | 72 | -0.35757 | 0.913 | 0.901 | 0.824 |
| MJS_Emo8 | CloseWork | 2 | 35.6 | -0.29119 | 0.953 | 0.955 | 0.678 |
| MJS_Emo3 | SmileFriendly | 2 | 28.8 | -0.28715 | 0.952 | 0.951 | 0.679 |
| IJS_22 | Kissing | 3 | 48.8 | -0.08604 | 1.05 | 1.026 | 0.265 |
| IJS_26** | Resentex | 3 | 43.6 | 0.02326 | 1.194 | 1.162 | 0.017 |
| GPTSSR_8 | Convinced Talking | 4 | 56.4 | 0.07687 | 0.882 | 0.884 | 0.903 |
| IJS_15** | Faithful | 1 | 47.2 | 0.09434 | 1.193 | 1.141 | 0.017 |
| IJS_2* | KnowDid | 4 | 45.6 | 0.13354 | 1.431 | 1.362 | 0 |
| IJS_4** | WorkSuspicious | 4 | 45.6 | 0.13626 | 1.184 | 1.11 | 0.022 |
| MJS_Cog5 | ThnkOthrIntst | 3 | 63.2 | 0.22398 | 1.042 | 1.064 | 0.297 |
| GPTSSR_1* | Gossip | 4 | 49.2 | 0.25318 | 0.814 | 0.83 | 0.984 |
| GPTSSR_3 | UpsetFrndJdge | 5 | 45.2 | 0.33355 | 0.918 | 0.914 | 0.808 |
| GPTSP_5 | Annoy | 5 | 38.8 | 0.42259 | 0.908 | 0.909 | 0.838 |
| IJS_7* | HelpJeal | 4 | 6.4 | 0.44322 | 1.796 | 1.429 | 0 |
| GPTSSR_5* | ThkAvoid | 5 | 29.6 | 0.52314 | 0.752 | 0.806 | 0.998 |
| MJS_Beh3 | QstnPast | 4 | 42 | 0.54206 | 1.007 | 0.995 | 0.441 |
| GPTSSR_16* | ThinkTalking | 5 | 28.8 | 0.55772 | 0.731 | 0.772 | 0.999 |
| GPTSSR_14 | FrustLaugh | 5 | 26.8 | 0.59703 | 0.796 | 0.864 | 0.991 |
| MJS_Cog1 | SusptSee | 6 | 20 | 0.61929 | 1.259 | 1.07 | 0.003 |
| MJS_Beh6** | QstnWhere | 5 | 47.6 | 0.62823 | 1.223 | 1.157 | 0.008 |
| MJS_Beh2 | UnexptCall | 6 | 20.4 | 0.63522 | 1.142 | 1.07 | 0.056 |
| GPTSSR_11 | CertHost | 5 | 25.6 | 0.63855 | 0.83 | 0.86 | 0.974 |
| GPTSP_15** | HostPurp | 5 | 22 | 0.64724 | 0.752 | 0.826 | 0.998 |
| GPTSSR_13* | StressWatch | 5 | 26.4 | 0.67334 | 0.774 | 0.845 | 0.996 |
| MJS_Beh4 | SmthgNast | 5 | 23.6 | 0.68124 | 0.97 | 1.027 | 0.604 |
| GPTSP_1 | CertInfor | 6 | 22.8 | 0.69692 | 0.936 | 0.898 | 0.742 |
| GPTSSR_9* | SingleOut | 5 | 24 | 0.71187 | 0.757 | 0.793 | 0.998 |
| GPTSP_14** | FeelBad | 5 | 16.8 | 0.77766 | 0.703 | 0.768 | 1 |
| MJS_Beh5 | QstnPhone | 6 | 22.4 | 0.81793 | 0.977 | 1.075 | 0.574 |
| GPTSSR_2 | HeardRef | 5 | 31.2 | 0.87926 | 0.881 | 0.878 | 0.905 |
| GPTSP_16 | AngHurt | 6 | 12.4 | 0.91813 | 0.899 | 0.915 | 0.863 |
| GPTSP_2 | DefPers | 6 | 10.8 | 0.92876 | 0.831 | 0.821 | 0.973 |
| GPTSSR_6 | DroppingHints | 5 | 14.8 | 0.95733 | 0.809 | 0.853 | 0.986 |
| GPTSP_10 | Confuse | 6 | 10 | 1.0365 | 0.72 | 0.831 | 1 |
| MJS_Beh1 | HndbgPoc | 6 | 4.4 | 1.24263 | 1.256 | 1.076 | 0.003 |

Notes *Outfit MSQ indicates elimination, **t-statistic indicates elimination (items to be eliminated in bold).

β = the position of the item along the unidimensional trait

Frequency is in cumulative percent - rarer is lower

Items at the top of Table 19 relate to less severe jealousy, those at the bottom of the table relate to greater severity and increasing suspiciousness and pathology. The *Misfit* statistics derived from of 42 item model (*Model 1*) indicate 13 items (in bold) show significant *Misfit*, and do not fit the unidimensional cumulative model. Two items show significant *Outfit*, and other items have significant *Infit* and therefore do not discriminate well, (these are indicated with an asterisk in Table 19 and detailed in Table 20). The results suggest that of the 42 remaining items, 29 items represent a cumulative latent jealousy trait comprised of various cognitions, affect, and behaviours. The 29 retained items (detailed in Table 21) are as follows: IJS— three items; from the *MJS* — eight *emotional* sub-scale items, five *behavioral* subscale items, and two *cognitive* subscale items; from the G-PTS — six *self-reference* sub-scale items and five *persecutory* sub scale items.

Table 20. Items removed from the combined Rasch scale.

| Excluded Items | | |
|----------------|--------|---|
| IJS | Outfit | IJS 2– <i>KnowDid</i> , Beh 1– <i>HandbgPoc</i> . |
| | Infit | IJS 4– <i>WorkSusp</i> , 7– <i>HelpJeal</i> , 15– <i>Faithful</i> , 26– <i>Resentex</i> B6– <i>QstnWhere</i> , SR1– <i>Gossip</i> , 5– <i>ThkAvoid</i> , 9– <i>SingleOut</i> , 13– <i>StressWatch</i> , 16– <i>ThinkTalking</i> P10 – <i>Confuse</i> , 14 – <i>FeelBad</i> . |

Table 21. Items retained in the Model 2. (29 items).

| Retained Items | | |
|----------------|---------------------------|---|
| IJS | | 13– <i>InCommonEnv</i> , 22– <i>Kissing</i> , 25– <i>Possessto</i> |
| MJS | Emotional (8 items) | Emo1– <i>CommentLook</i> , 2– <i>ExciteTalk</i> , 3– <i>SmileFriendly</i> , 4– <i>OtherTryCl</i> , 5– <i>Flirting</i> , 6– <i>OtherDate</i> , 7– <i>HugKiss</i> , 8– <i>CloseWork</i> |
| | Cognitive (2 items) | Cog, 2– <i>WorryOthrChase</i> , 5– <i>ThnkOthrIntst</i> |
| | Behavioural (5 items) | Beh 1– <i>HandbgPoc</i> , 2– <i>UnexptCall</i> , 3– <i>QstnPast</i> , 4– <i>SmthgNast</i> , 5– <i>QstnPhone</i> |
| | Self-reference (6. items) | SR 2– <i>HeardRef</i> , 3– <i>UpsetFrndJdge</i> , 6– <i>DroppingHints</i> , 8– <i>ConvincedTalking</i> , 11– <i>CertHost</i> , 14– <i>FrustLaugh</i> |
| | Persecution (5 items) | P1– <i>CertInfor</i> , 2– <i>DefPers</i> , 5– <i>Annoy</i> , 10– <i>Confuse</i> , 16– <i>AngHurt</i> |

Comparison of PCM Model 1 and Model 2

Results of the PCM fitting of this improved model and a comparison of joint log-likelihood fit statistics between *Model 1* (42 items) and *Model 2* (29 items) suggests that the more parsimonious 29 item model does not differ in fit with the latent variable [*Likelihood Ratio* = -9572.798 (74), $p = 1$], i.e., it is non-significant. The *Anderson LR* test for this model is also nonsignificant (*LR* value= 68.53 (62), $p = 0.266$ which indicates subgroup homogeneity/model fit.

Table 22. Fit statistics for Model 1 and 2.

| | Value | Npar | <i>AIC</i> | <i>BIC</i> | <i>cAIC</i> |
|----------------|-----------|------|------------|------------|-------------|
| <i>Model 1</i> | -13542.01 | 316 | 277716.01 | 28831.31 | 29147.31 |
| <i>Model 2</i> | -8695.68 | 215 | 17821.36 | 18580.19 | 18795.19 |

The item parameters of *Model 2* are presented in Figure 12. with the items geographic location representing the severity of the underlying unidimensional trait. That these items (including those that are thought to describe normal jealousy) form a single continuous dimension (displayed in Figure 12) indicates that there is a single latent trait underlying increases in jealous severity. The continuum has an observed predominance of better evidenced or justified relationship threat at the lower end (top of the diagram); the central region shows increased jealousy, has more self-referent thought, greater distress, social anxiety, and interrogative behaviours; and the upper end (bottom of the diagram) has more persecutory thought, abnormal perception, and invasive behaviour.

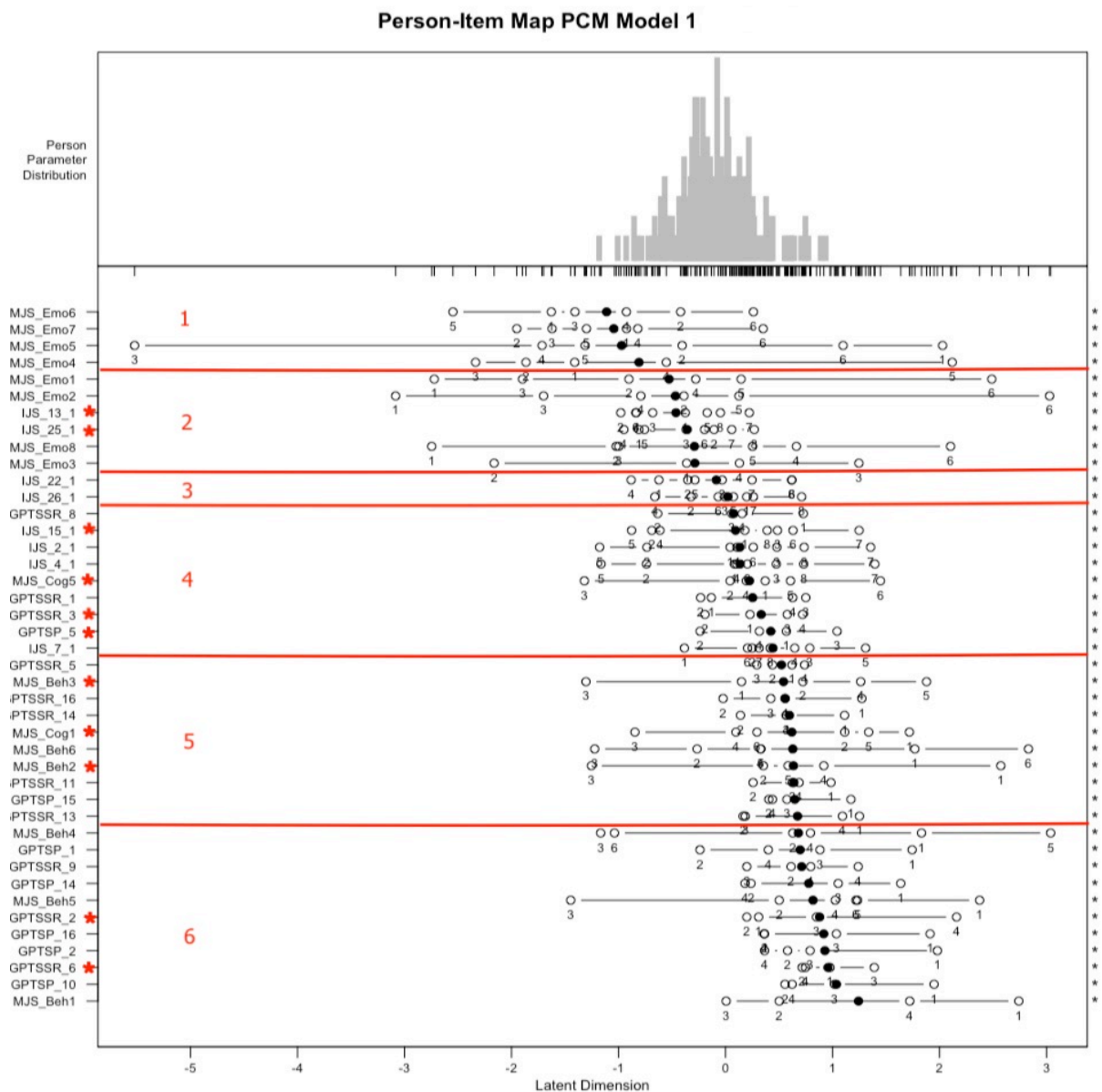


Figure 12. Location and item fit of the Model 1 jealousy items.

N.B. Red asterisks indicate items that Misfit the model suggested by the MDS. * indicates item reversal. Horizontal red lines indicate categories in the cumulative structure identified during MDS Analysis, these sections are numbered by cumulative category.

Discussion

To our knowledge, this is the first study to assess jealousy and paranoia measures concurrently in order to determine if there is evidence for a cumulative latent structure, and whether there is overlap between these constructs. The findings presented

in this chapter indicate, that as the MDS analysis in Chapter 4 suggested, the current sample jealousy is indeed cumulative. Given the use of Rasch analysis this finding is anticipated to be invariant in the general population. It is fair to conclude therefore that suspiciousness is a singular cumulative phenomenon, with both jealousy and paranoia comprising a single process which underlies increasing severity. The findings also indicate a substantial overlap between jealousy and paranoia, whereby increasing levels of anxiety precede both increased jealous pathology and paranoid ideation. Therefore, it is likely that the same underlying psychosis-like process causes jealous and paranoid pathology; as evidenced by increased severity in items from both scales which follows a psychosis-like or schizotypy process (Kidd, Hammond, & Bishopp, 1998).

The final retained scale items discriminate the latent dimension well. As might be expected the most severe items relate to invasive behaviours, and persecutory thought. Whereas, the least severe items relate to thoughts and emotions that result from substantiated behaviours that are more likely to indicate intimacy with a potential rival rather than resulting from imagined partner behaviours. What is more unexpected is the apparent anxiety process by which severity increases that mirrors that of paranoia and other forms of psychosis (Freeman et al., 2002).

The suggested process outlined in Chapter, 4 is largely reproduced and augmented by the scaling analysis presented in this chapter. Chapter Four suggested that jealousy may be cumulative; this chapter's findings extend this by suggesting that there are no underlying distinct factors. Rather, that jealousy has (a) a dimensional structure which is qualitatively different, depending on the level of severity, and (b) that a number of personality traits, e.g., neuroticism and hostility, contribute to jealousy escalation. This can be seen by relating the severity scale to the proposed structure in the previous

chapter. Descriptively, higher jealousy and higher paranoia levels are related, and jealousy forms a single cumulative, latent unidimensional structure indicative of an escalating process with a common latent origin.

Escalation of both jealous and paranoid pathology was found to relate to increasing anxiety, distress, and level of ideation/delusion. This is notable as, rather than suggesting distinct neurotic/psychotic subtypes, it suggests that suspiciousness and the invasive or aggressive behaviours associated with jealousy result from a process. Whereby unproblematic jealousy is more closely related to concrete events that threaten the romantic relationship, and angry thoughts (i.e., reactive jealousy, Bringle, 1991; Bringle & Buunk, 1991), and problematic jealousy is more closely related to increases in anxiety, accompanied by increased paranoia, suspiciousness and preceding invasive or hostile partner or rival-directed behaviours.

Similarly, to models of paranoia (Freeman et al., 2002) increasing levels of anxiety appear to drive the escalation of self-referent thoughts, and suspiciousness in jealousy. In non-clinical groups ideas of self-reference are more common than persecutory ideation, whereas in clinical groups the reverse pattern is observed (Green et al., 2008). This process is also mirrored in the current analysis, with persecutory ideation indicative of greater jealous severity. The most extreme jealous behaviours, as measured by the scales included in this research (that might be considered less severe than those exhibited by clinical and forensic populations), are related to suspicious persecutory thoughts.

Previous research and theory (discussed in Chapter 2), is largely based on factor analyses, and has mostly conceptualized the structure of jealousy as typological, with normal and pathological jealousy sub-types (e.g., White & Mullen, 1989), or types

related to discrete clinical diagnoses, e.g., depression, psychosis or obsession (e.g., Marazitti et al., 2010), or types related to the perceived source of relational threat (Mathes & Severa, 1981). However, more recent suggestions have suggested that a specific form of psychotic jealousy may be continuous in nature (Lima et al., 2017).

Contrary to these findings, the current results indicate that jealousy as a whole is continuous in nature. That is, it forms a unidimensional cumulative, latent process that evolves from an unproblematic (normal) form. Furthermore, it suggests not a psychotic form (e.g., Marazitti et al., 2010) but a psychotic-like process is involved in jealousy escalation in non-clinical populations and that psychosis-like ideation and delusion, is not only related to severe delusional forms. Furthermore, these findings suggest that psychotic or neurotic jealousy are not distinct forms of jealousy, as Marazitti et al. (2010) suggest but that neurosis-like symptoms relate to lesser severity and that psychosis-like symptoms relate to greater severity. Given that in the current results the enhanced focus on persecutory rather than self-referent thought in both forms of suspicious thought (i.e. jealousy and paranoia) is associated with more severe ideation; this adds to the accumulated evidence that persecutory thinking is involved with greater severity (see Green et al., 2008).

This study used Rasch analyses to examine responses on several of the most popular measures of jealousy and paranoia. Findings related to the scales suggests three areas for development. Firstly, findings suggest a great deal of redundancy in items included in all the analysed scales and that scales could be usefully shortened to make more precise and concise measures. Findings also suggest that the item bank should be extended. Whilst items that measure respondents' thoughts and feelings are well distributed across jealousy severity, giving indication of both the relationship between

these and their relationship to each other and behaviours. Items that relate to behaviours at the less severe (normal) end of the scale are absent. The items also do not capture behaviours (such as stalking or partner aggression) that research relates to more clinical/forensic populations, and therefore it has not been possible to describe their relationship to the proposed continuum. Furthermore, the ordering of response categories in the analysis suggests that respondents do not conceptualise intensity in the same way as the test developers have. There is a great deal of reversal in the category ordering, particularly in the nine-point IJS. Therefore, all the scales require revision of the response categories which should be collapsed to result in fewer response points.

Clinical Implications

The way jealousy is conceptualised appears contradictory in that it may, even at what appear to be severe levels of distorted thinking (delusion) have the tendency to be normalised, as evidenced by the lack of focus on jealous pathology in all but the most severe kinds (Soyka & Schmitt, 2011) and lower hospitalisation, treatment and readmission rates for individuals where jealousy is the primary focus of delusion (Crowe et al., 1988; Gutierrez-Lobos, Schmid-Segal, Bankier, & Walter, 2001); or paradoxically, given the prevalence of jealousy in the population that should indicate its normality, it is often pathologised (Mullen, 1991). Forensic studies suggest jealousy is the symptom of personality disorder (Dutton, 1994) or alternatively that it only becomes a forensic problem when it results in aggression or control against a romantic partner (Archer & Webb, 2006). However, the findings here suggest that jealousy may be more effectively characterised by its relationship to psychosis, and therefore that it is present on a continuum in the general population, with increases in both jealous and paranoia pathology related to the underlying psychotic trait. The findings presented here, would suggest a focus on early intervention, and alleviating paranoid thinking rather than

anger management, or amelioration of other mental health conditions should be explored. Furthermore, findings suggest that methods used to alleviate symptoms of other delusional conditions, e.g., paranoid ideation, such as anti-psychotic medication, sleep management and anxiety management, (Rehman et al., 2018) may also be helpful in cases of increased jealous pathology.

Limitations of the present study include the relatively small sample size for a community study. However, despite the sample size in this analysis being relatively small for Rasch analyses (Linacre, 1994), the sample is adequate for the parameter estimation, and furthermore the participants within this analyses span typical scores for a community sample (see Green et al., 2008) with a proportion of participants (58% with subclinical persecutory ideation, 84% with sub-clinical self-referent ideation, Green et al., 2008); 95.6% some level of sub-clinical paranoia, (Fenigstein & Venable, 1992) also scoring within the sub-clinical range on measures of paranoia the current analysis is likely to give information across the expected range of a community sample. The inclusion here of those who score within the clinical range means that these results should encapsulate the more severe end of the community range and are suggestive of those that might be found in clinical populations. By using a Rasch analysis with an adequate population, the sample characteristics should not influence the relationship between the explored concepts. A further limitation relates to the gender biased sample, which was due to the inclusion of social science students who received credit for participation and who are mainly female. Future analyses should seek to remedy this.

Conclusions

Due to their differing content, irrational thoughts and jealous thinking are treated as discrete constructs. Therefore, many studies of jealousy fail to capture potential

associations between the presence of irrational and its relationship to jealous pathology. However, this study shows a clear interrelationship between pathological jealousy and paranoid ideation, in that they form a unidimensional structure. In addition, increasing paranoid pathology is not differentiated from increasing jealous pathology. That items show a lack of distinctiveness between jealousy and paranoia suggests that they describe the same latent construct. It is likely therefore that increasing pathology in both constructs is related to shared underlying psychological and physiological processes that warrant further investigation. If improvement of the understanding and differentiation of underlying processes are targeted by future research, Rasch analysis should be applied to clinical and forensic samples, using an extended item bank of more severe behaviours more suited to this population.

CHAPTER 6: (MIS) UNDERSTANDING PROCESSES IN THE CONFLICT RESOLUTION OF ROMANTIC DYADS: A CUED RECALL STUDY

The preceding two chapters explored jealousy's structure and its relationship to paranoia. The findings also suggested that there is a likely overlap in the different kinds of interpersonal, suspicious thought.

One reason why both jealousy and paranoia are the target of research interest is due to the impact that both can have on social relationships, in particular their influence on relationship quality, conflict escalation and interpersonal aggression. What is clear is that, as they are both types of social cognition where a relationship or relationships are their focus, neither paranoia nor jealousy exist without the context of a relationship.

As previous chapters suggest that different types of irrational thoughts co-occur, it is possible that both types of thinking evolve concurrently within the social relationship itself and influence, or are influenced by, the social relationships towards which they are targeted. However, even research that proposes to take an in-depth approach (e.g., for jealousy; Soltani et al., 2017; and for paranoia; Dickson et al., 2016) does not explore either dyadically, i.e., it is decontextualised, and it therefore fails to give an account of the dynamics of these kinds of social thinking within a relationship. Furthermore, it is not clear if these thoughts and dynamics also occur in healthy relationships, or how this might happen, i.e., what is the process that this takes, and what the subsequent influence of irrational thoughts on the social relationship might be. This chapter considers whether processes revealed in previous analyses (Chapters 3 & 4) are found within conflict resolution in functional romantic relationships. Specifically, this chapter explores conflict resolution processes and transactions related to suspicious

and irrational thinking, in real time, within a dyadic framework, from a number of different perspectives.

Cognition refers to unconscious mental mechanisms that bring about representations of experience, of which we may or more often may not, become consciously aware; social cognition refers to any cognitive process involving other people (Frith & Blakemore, 2005). Green, Horan, and Lee (2015) suggest social cognition encompasses the processes involved in thinking about ourselves and other people and can be categorised into four areas: social cue perception; experience sharing; inferring other peoples' thoughts and emotions (i.e., mentalising); and management of emotional reactions. One type of social cognition, the understanding of another's intentions and mental states, is most often, automatic, intuitive and triggered by stimuli of which we are not necessarily aware but may become so during reflection (Frith & Blakemore, 2005).

Impairments in non-social and social cognition are features of psychosis and contribute a great deal to the burden of mental illness and pathology (Green et al., 2015). Recent research reviews indicate specific patterns of dysfunction whereby sufferers of psychosis show normal functioning in areas thought previously to be abnormal, such as emotional and non-emotional facial and verbal recognition, experience-sharing capacity and the ability for emotional recognition in self and other; the key problems people with psychosis face are with social cue perception, mentalising (empathic accuracy) and emotion regulation (Savla et al., 2013). In addition to the greater levels of general distress suffered by people with paranoia, impairments in these three abilities appear to be in the degree to which the ability is present or utilised not in

the type of process employed (Green et al., 2008; van Os et al., 1969; van Os et al., 2009). It is likely given the prevalence of psychosis (Johns et al., 2004, Johns & van Os, 2001) and paranoia (Bebbington et al., 2013; Freeman, Gittins, et al., 2008) symptoms in the general population, that sub-clinical symptoms characteristic of psychosis, including impairments in socio-cognitive function are also present in varying degrees in normal populations on a continuum of severity.

The socio-cognitive impairments in psychosis and pathological forms of jealousy have certain parallel features (outlined in previous chapters), such as increased threat sensitivity, rigid thinking, and self-referencing in ambiguous situations (Bringle, 1991). In order to determine if and how these phenomena are related, it is important to understand both the sequence in which irrational thinking unfolds, and the social context in which it occurs. Developing new insights into the role of erroneous social cognition and its connection to relationship outcomes in the general population would seem like a logical step in better understanding any cognitive processes involved, in particular the form that any socio-cognitive impairment might take within a dyadic relationship. Those processes by which both accurate and inaccurate understanding of others' intentions arise and are maintained during interpersonal transactions could give further information about how they are related.

In terms of increased threat sensitivity, social events are experienced as salient in deciding whether there is a threat (Kapur, 2003). Epidemiological data consistently suggests that people with paranoia differ from the non-paranoiac regarding which situations and whom they find threatening; and that unsafe and stressful social environments (e.g., deprived, urban environments) play a significant role in psychosis

(Fornells-Ambrojo et al., 2015). In daily-life people with low to medium paranoia scores respond differently and tend to perceive greater threat when interacting with unknown people, whereas people high in paranoia perceive high levels of threat from both familiar and unfamiliar people (Collip et al., 2011). Stress is generally thought to be a response to threat (Lazarus & Folkman, 1984; Selye, 1946). Couple conflict is found to be stressful by many people (Coyne et al., 2001), and therefore it seems reasonable to suggest that the threat present in partner disagreements may be perceived as more threatening by people with paranoia, as the person is familiar and partner conflict is a situation where social threat is often experienced.

Processing complex emotions, such as jealousy, differs from that of simple emotions and require more than just the facial recognition of emotion; there is an implied awareness of another's thinking about oneself and the relation of oneself to others (Blakemore, Winston, & Frith, 2004). Mentalising is a complex process that appears impaired in psychosis (Green et al., 2015) and schizophrenia (Bentall et al., 2001). Mentalising is an implicit, automatic, intuitive and innate ability to recognise other people's intentions and inner mental states; it is an important part of effective social interaction (Baron-Cohen et al., 1985). It is long established that this pervasive and automatic response appears to occur prior to deliberative, more reasoned thought (Heider & Simmel, 1944) and could therefore be said to be intuitive, i.e., automatic, prior to deliberative thought (Frith & Blakemore, 2005).

In summary, impairments in social cognition symptomatic of psychosis, in particular in those abilities to mentalise and correctly interpret the actions of others, also appear to be involved in the development of (persecutory) delusions (Bentall et al.,

2001; Frith, 1992). These are likely to incur social penalties, for example, in the inability to successfully resolve conflict.

It is likely to be difficult, even for those without socio-cognitive impairments, to accurately decide on other's motivations or whether what is being said is truthful. Social situations often involve making judgements where available information is incomplete or ambiguous. A factor that complicates these judgements is that, as most people's everyday experience would suggest, others sometimes deliberately engage in deception. Most adults understand that their own perspective and those of other people on the same event can differ and that implicit judgments about another person's perspective often need to be made, which in turn, can sometimes lead to the misinterpretation of other's actions as insults (Frith & Blakemore, 2005). Couples frequently begin conflict resolution by 'mindreading' (Gottman, 1979). In romantic relationships the inaccurate construal or representation of meaning can become especially emotive and feeling misunderstood contributes a great deal to marital conflict and distress (Gottman, 1998). Effective conflict resolution requires people to use complex reasoning about their own state of mind, views and feelings (self-awareness) and those of others. In addition, it requires people to be reasonable and flexible in order to acknowledge and/or accommodate the other's point of view (Fisher, Ury, & Patton, 1981).

We might hypothesise that conflict resolution is one social activity which those with impaired ability to understand other's intentions find difficult. Social cue perception, mentalising, and emotion regulation, proposed to result in relationship difficulties (Frith & Blakemore, 2005), are the social cognitive processes impaired in psychosis and it is therefore a simple leap to suggest that these processes might also be

those processes necessary for the effective resolution of couple conflict. Furthermore, stressful situations increase the likelihood of irrational beliefs surfacing and forming (Freeman & Garety, 2006; Myin-Germeys et al., 2005). As partner conflict is found particularly stressful by many people (Harburg, Kaciroti, Gleiberman, Schork, & Julius, 2008), it is likely that partner conflicts will be a situation where social cognitive impairments will arise. Rationality in this context is defined as practical rationality (for a discussion see Craigie, 2011). An act or belief is considered to be irrational if it is unlikely to help the person meet their goals. People who are overly suspicious might be generally understood as having a number of difficulties with social interactions (Freeman & Garety, 2006) including withdrawing from social contact, being difficult to reason with, perceiving offence where no offence is meant, making claims that are not plausible, or unfoundedly accusing others of behaviour or intentions. It is likely that these behaviours would adversely impact their ability to meet their social goals. In the case of social relationships, it might be suggested that behaving in ways that are likely to alienate someone with whom we wish to sustain a relationship does not constitute a practically rational decision. Irrational thoughts are likely to play two roles: firstly, they are enacted in order to protect the self from perceived threats, and secondly, because these threats are generally exaggerated or misconstrued, they undermine the mutual understanding and trust in the relationship *unless* the other party accommodates the irrationality, in an asymmetrical solution to the relational problem. The understanding of rationality for the purposes of this chapter, does not mean absence of emotion or empathy. Rationality here means that an individual's responses may be understood not just by reference to a person's logical deduction or cognitions about an event or experience, but also that they may be informed by their emotional or empathic

responses.

Previous chapters noted that jealousy has frequently been explored using cross-sectional/static techniques. However, an established technique for exploring social cognition is to use qualitative and dialogic techniques that capture the rich, dynamic, processual nature of social interaction (Frith & Blakemore, 2005). Furthermore, the transactional stress model (Lazarus & Folkman, 1984), on which cognitive models of jealousy are based, suggests a process by which stress (and therefore jealousy) unfolds. In order to effectively research this evolving process, the research requires exploration using micro-analytic methods that allow tracking of the phenomenon over time allowing intra and interindividual changes to be effectively captured (Lazarus, 1999) giving an understanding of causal direction and more accurate assessment of the relationship between variables. However, no research using a suitable design was found. Whilst there is some research on the role of intra-personal processes in virtual-reality environments (Fornells-Ambrojo et al., 2015) the processes that relate to real-world development and maintenance of paranoid processes during potentially threatening dyadic interaction (such as relationship disagreement) are unresearched. Irrational thinking may play a role in conflict escalation and it is important to understand whether it is present during partner conflict in non-clinical populations and how it is managed.

Furthermore, little is known about how irrational beliefs change. By using irrational or erroneous thoughts about partner intentions as a target for understanding, it may be possible to learn more about this process. Given that the whole premise of ‘talking therapies’, such as counselling and Cognitive Behavioural Therapy, is that dyadic interaction can change one’s beliefs (e.g., Adler, Strunk, & Fazio, 2015), it is a

short leap to suggest that belief change is socially facilitated. Aspects of couple dyadic interaction may contribute to belief flexibility or rigidity. Therefore, a qualitative approach should be employed to develop an understanding of the socio-cognitive processes in real time, and within a more natural evolving dynamic situation, that mimics typical disagreements.

There are ethical and methodological issues with recruiting to a study of couples, where one partner is believed to be very jealous. However, as previous chapters outline suspicious thinking occurs frequently in the general population and as discussed above, is likely to be the source of some conflict within most relationships. Therefore, by exploring conflict resolution within the dyad, and in particular by asking how each participant perceives the other's intentions, it is hoped to explore the role played by social cognition and emotion in everyday relationships, and furthermore to elicit discussion of participants' irrational thought processes.

Cued Recall

Cued recall has been used to understand socio-cognitive partner processes in general research (Darling & Clarke, 2009; Hinnekens, Ickes, Schryver, & Verhofstadt, 2016; Hinnekens, Loeys, Schryver, & Verhofstadt, 2018; Simpson et al., 2011; Thomas & Fletcher, 2003; Welsh & Dickson, 2005) and interpretive studies (Meneses & Larkin, 2015). As reports are made after the event, the method is seen as having less impact upon cognition than other think-aloud methods (Suchman, 1987). This method allows understanding of interaction processes and so is appropriate to theories based on transactional models of ideation and delusion (Freeman & Garety, 2004) and jealousy (Bringle, 1991; Mullen & White, 1989). Video recall techniques enable a view of processes that evolve over time and give some indication of temporality and

directionality in people's reasoning processes, including processes that initiate fact checking and proposed mechanisms, for example anxiety cues, said to precede more intuitive, experiential reasoning. The method also enables people to recall more detail about their thought processes, motivations, emotional state and perceptions than interview alone (Henry & Fetters, 2012; Welsh & Dickson, 2005).

As yet, there has been no in-depth study that explores the process and context of (mis) understanding and reasoning, the role of intuition and irrational beliefs in couple conflict discussions, and how truth and reality are negotiated and co-constructed in every-day couple conflict situations. The exploration of couple conflict in non-clinical couples, in vivo, gives a dynamic situation within which to explore how people come to understand or misunderstand each other, to see if elements of irrational thinking, biases, and unchecked use of intuition can be detected and if erroneous beliefs are amenable to challenge. In addition, this method can be used to explore which type of challenges work to change these beliefs and which do not and in what circumstances.

The overall aim is to explore reasoning about other's intentions and irrational beliefs in couples' attempts to resolve conflict and how these are managed in a non-aggressive relationship. Furthermore, the study aims to explore sequences and the context of how partners come to understand their own and the other's intentions and irrational beliefs, make themselves understood, and how both intuition and irrational thinking are managed and viewed. In particular, within the context of a couple cued recall disagreement discussion:

1. How and when do accurate or erroneous understandings of the other's intentions arise, and how are these (mis) understandings revised or maintained?

2. How and when do irrational beliefs arise, how are these irrational beliefs revised or maintained, and how do they influence the discussion?
3. How can we conceptualise how partner's individual credibility and power are managed and negotiated in conflict discussions?

Method

The current study takes a qualitative approach. Semi-structured interviews were conducted, and written accounts provided by participants. Data were analysed using interpretive and critical analyses.

Participants

The study involved five English-speaking dyads of heterosexual intimate partners, recruited via the University of Birmingham Research Participation Scheme as a follow-up from a prior questionnaire study. All participants were screened for partner abusive behaviours (using the CTS-R; Strauss, Hamby, & Boney-McCoy, 1996) and were either unpaid or received course credits for involvement. Consent was gained at each of the three procedural stages for each participant. Nineteen participants with romantic partners (71%) indicated that they would be prepared to take part in the follow up study, seven couples with the longest-standing relationships were approached to take part. Five couples selected into the study (with one additional couple, who met the criteria for inclusion, selected to take part when one couple's data proved to be unusable due to a recording problem).

Interview Preparation

A semi-structured interview schedule was prepared during supervision discussions to explore a conflict situation and the process each couple used in order to attempt resolution of this (Appendix G).

Procedure

A pilot study, not reported here, with a single dyad was conducted to test the procedure (i.e., camera position and sound recording settings). Data collection was divided into three stages detailed below: discussing a disagreement; participating in a joint interview; and completing a series of individual written questions.

Couples were asked to choose a previous or on-going disagreement which they were both willing to discuss with the researcher.

Stage 1: A guided discussion took place in the presence of the researcher, who provided a single initial directional question, ‘Could you take a few moments to think about a recent conflict situation from your own point of view (pause). Then if you both tell me how it started and then developed and how you resolved or didn’t resolve it. Who would like to go first?’ Prompts and probes were used to ensure sufficient coverage of the disagreement for analysis (Schedule in Appendix G). This discussion lasted for approximately 15 minutes and was video recorded with the camera positioned so that the full body and face of both participants was captured in addition to dialogue. After finishing the discussion, the camera was stopped. Instructions were then reviewed for the following stage.

Stage 2: Video footage was replayed to the participants on a computer screen. Participants were asked to pause the video whenever they noticed a significant moment and to comment upon what it was that made them pause. Participants were shown how to control the playback so that they could pause it when they needed. They were asked to recall what they were thinking at the time and to elaborate on their thoughts. A written interview schedule was prepared in advance (see Appendix H) to guide this

discussion. The discussion was audio-recorded using a digital recorder. The interview finished when the dyad ran out of comments on the recorded experience.

Stage 3: This final stage was introduced with the objective of gaining a view of individual perspectives regarding matters that had arisen in stages 1 and 2. Couples were separated into nearby private rooms to answer some pre-prepared written questions about their thinking in relation to the discussion (see Appendix I). The questions were, in part, constructed using The Safety Behaviours Questionnaire — Persecutory Beliefs (SBQ; Freeman et al., 2001), which has proven validity in accessing psychotic processes in community and clinical samples (see Appendix J)

Analytic procedure

Transcript analysis followed a procedure suggested by King et al. (2008) that was consistent with the approach underlying each of the methods used: Framework Analysis, and IPA (Smith, Flowers, & Larkin, 2009), and Critical Analysis (Billig, 1996; Harré, 1997). Verbatim transcripts of the dyadic discussion and couple interview were made by the investigator, followed by a pluralistic analysis of the accounts. The data were imported into *NVivo for Mac* (www.qsrinternational.com) software, to facilitate organisation and systematic coding using theoretically informed constructs derived from the literature and emergent themes to code data. Accounts were re-read to ensure familiarity with the data. One set of accounts was hand-coded descriptively, line-by-line, and then coded for emergent analytic themes by the investigator and reviewed with an academic supervisor. Interpretive Phenomenological Analysis (IPA) methodology was then used to generate themes and subthemes within the data ‘using data as a lever to evaluate existing theories and models’ (Smith, Flowers, & Larkin, 2009, p. 48). One set of data (two transcripts from each of a couple, and their separate written report) was

coded separately by two coders, the author and her supervisor (ML). These reports were then checked for agreement on codes. Further individual reports were each then coded by the author separately and then emergent themes were checked with the author's supervisor with themes and sub-themes verified in the rest of the data. Subsequently, the audio and video-recordings from two couples were viewed and listened to by both supervisors (ML & DB) to both verify the codes with the data and incorporate alternative understandings of the data. A shortlist of themes and subthemes was then verified by an experienced researcher from a different area of psychology, using a sample of two anonymised transcripts and selected quotations from the remaining transcripts, and any additional understandings were again incorporated. In addition, Miranda Fricker's (2007) critical feminist epistemological injustice theory (detailed in this chapter's discussion) was used to explore an emergent theme of power, credibility and voice. To garner empirical support for the post hoc interpretations of the rationality or irrationality of participant's beliefs, three judges (doctoral students in psychology) who were blind to the study and its results, independently assessed the relative rationality of each judgement, gave a subjective assessment of its likelihood, and reported experience and counter-arguments in the dialogue that would suggest the belief was inaccurate. The supervisor (ML), who is an expert in the phenomenological method then reviewed the completed analysis and confirmed that the correct process had been used. Examples, which illustrate the analytic process are included in Appendix K.

Results

Overview of Results Section:

Summary of Findings

Question 1: How do people come to (mis)understand their partner's intentions? In addition, which aspects of the people and situation might influence whether such (mis)understandings are revised or maintained and by what process do either occur?

Process 1: Understanding the other's intentions

Process 2: Revising understanding of the other's intentions

Process 3: Maintaining the original understanding of the other's intentions

Question 2: How do irrational beliefs arise, and do conflict discussions contribute to their revision or maintenance?

Process 4: Difficulty in dismissing irrational thoughts based on intuition

Process 5: Accommodation

Question 3: How are partner's positioned (Davies & Harré, 1990) in conflict discussions, by irrational thinking or erroneous intuition?

Process 6: Sense of not being able to make oneself understood

Couples' disagreements had various themes, summarised in Table 23. Couple number 1's disagreement focused on another male that the male partner thought of as a romantic rival. Couple two discussed the woman's repeated enquiry about the man's health and wellbeing. Couple 3 disagreed about her spending habits; with the man maintaining his girlfriend spent recklessly. Couple 4 disagreed about who removed food from the household, centring on the female's fear of food contamination. Couple 5 disagreed about preferred noise-levels particularly from electronic entertainment, with the woman wishing noise levels to be lower than the man. In general, disagreements were discussed calmly and each member of the couple attempted to present their views openly. Each disagreement differed in terms of its constructiveness. Interestingly, the focus of each disagreement that couples brought to the study was found to be the result of an irrational

belief held by one partner. Table 23 provides information about participants as well as the subject of conflict. Throughout the results section, unless otherwise stated, quotations were chosen for typicality.

Table 23. Summary of participant details.

| Couple (Pseudonyms) | Age | | Conflict Theme | Relationship Status | Relationship Length |
|------------------------|--------|------|--------------------------------|------------------------|------------------------|
| | Female | Male | | | |
| 1. Brandon and Brigid | 19 | 18 | Jealousy | Cohabiting | 1yr. 7 months. |
| 2. Jed and Hope | 20 | 19 | Trust and Phobia | Dating | 5 yrs. 3 months. |
| 3. Uzma and Ali | 19 | 18 | Spending/Money | Dating | 2 yrs. 7 months. |
| 4. Dan and Hannah | 25 | 26 | Responsibilities and Phobia | Cohabiting | 4 yrs. 7 months. |
| 5. Jenny and Peter | 30 | 31 | Preferred Level of Noise | Married | 7 yrs. 2 months. |

The results are organised according to which research question they answered and subdivided into processes found in the data, and then into phases or factors within each process. *Process Five* overlaps two questions, 2 and 3; with only the final phase of *Process Five* relating to question 3.

Irrationality was defined here as an idea held by an individual that appears implausible or improbable due to the given evidence, counter-evidence, or usual behaviour of the people involved or where the irrationality of the belief was raised or acknowledged by at least one party: either the holder themselves, the partner, or the interviewer. An example, of this is Hannah who has what might be considered a phobic response i.e., very afraid of and has an exaggerated gag response, to food that is out-of-date or mouldy, and therefore for example, will not approach the fridge to remove it. She attempts to manage food storage in order to avoid contact with food, and also insists that Dan takes responsibility for the management of food perceived to be out-of-date.

Her views about food contamination and her response here are judged to be irrational on the basis that

a) the food she is avoiding is unlikely to constitute a health threat given the evidence, that she is afraid of the sight, smell and physical contact with rather than the eating of mouldy food, for example she says,

b) that the exaggeration or irrationality of these beliefs are acknowledged in the interview by the couple

Hannah: *'Where I just don't like the smell, and how it will look. And anything like that it makes me feel sick. I'll just ask you to do it' and So that I don't have to be in that situation where I'm really trying a/not be sick, because of the food'.*

And later on

Dan: *Sometimes it's perfectly fine, and then you just chuck it in the bin wash off the bin and its fine.*

Hannah: *'But it's not it's just like looking at the smell and everything. It makes me feel so ill',*

Dan: *'I really don't like think a lot of that's like more mental than actual like the physical input. Like you know it is just food that's gone slightly old. It's it's you you feel like that's really horrible, so you have like that experience of being really scared of it or whatever'.*

Later in the discussion:

Hannah: *So, when you say, 'Oh you're deciding to do something' as if its intentional. That I want to be like this, if that makes sense, I don't obviously want this! Kind of. like obviously, yeah it would be easier, if I could just take the food out, put it in the bin. We don't have to have the discussion about it, cause I could just do it; whereas to me, it sounds like you think I'm just doing it to be difficult.*

There is also some discussion between the couple of desensitisation and flooding techniques referring to her fears of food, which suggests that they both believe it to be irrational.

The concept of irrationality used here is that a seemingly irrational belief might be understood firstly, as mentioned above, by its functionality, but also in relation to the belief-holder's past experience or their current emotional state. Thus, an empathetic listener would be able to understand why the holder of the erroneous belief understood the situation in the way that they did, given the belief holder's past experience or their

current emotional state. Therefore, in this study and in contrast to other common conceptualisations, irrationality was not judged on the basis that a seemingly erroneous belief was incomprehensible or not understandable (Jaspers, 1997).

Summary of Processes

Five discussion transcripts, five interview transcripts and ten written question booklets were generated and analysed to reveal processes in both recalled incidents and the video-recall discussion. This analysis was used to answer the research questions using illustrative participant quotes and focussing on similarities or dissimilarities between the couples. Six main processes associated with intention understanding and irrational thought emerged that show some cross-case variation across: Understanding the other's intentions; Revising beliefs about the other's intentions; Difficulty in dismissing intuition; Difficulty of dismissing irrational thoughts based on intuition; Accommodation; and The sense of not being able to make oneself understood.

Question 1: How do Understandings of a Partner's Intentions Arise, and in What Circumstances and in Addition, How and in What Circumstances are they Revised or Maintained?

Process 1: Understanding the other's intentions. More accurate⁵ understandings of a partner's intentions seemed to reflect the presented evidence and employed a process that was iterative. Furthermore, where initial judgements were inaccurate, people who eventually formed more accurate beliefs, were able to revise them by incorporating subsequent information that contradicted the initial belief (e.g., their recollections of the partner's previous behaviours or their partner's own account of

⁵ on the basis of being subjected post hoc analysis as detailed in the analysis section.

their intentions that contradicted the assumed intention). Whereas those who maintained the initial unlikely belief appeared to use only confirmatory evidence. A main source of evidence used was repeated conflict; partner disagreements, due to both the content of the partner's challenge, and active resistance by one partner to the position or behaviour of the other, served to initiate partner's awareness of each other's intentions and motivations. Understandings of partner's intentions were formed using a composite of the different evidence available. People used different blends of internal (intuitive inferences/emotional) evidence and external (contextual/behavioural) evidence to form decisions about their partner's intentions, combining: intuition (i.e., fast, automatic thinking processes often upon reflection based on interpretations of the other's body language and voice tone); contextual information about the situation (e.g., social expectations attached to a role); and also rationales based on their partner's previous behaviour. This blend appeared to determine the accuracy and rationality of beliefs about the other's intentions

1.1 Intuition. Like nearly all psychological concepts, intuition has multiple and contested definitions and has been the subject of much debate which is difficult to resolve as much of it hinges on the nature of consciousness (and therefore unconsciousness) (Epstein, 2010). Here, intuition is defined as awareness that is non-analytic, unconscious, rapid, effortless, and involves associative thinking, in contrast to reasoning which is based on the systematic and deliberative search for counter-evidence, recognition and incorporation of information about the immediate situational context or knowledge of previous situations (e.g., Chen, Duckworth, & Chaiken, 1999; Kahneman, 2003; Sloman, 1996; Smith & DeCoster, 2000; Strack & Deutsch, 2004). In agreement with Ma-Kellams and Learner (2016), the findings suggest that intuitive

inferences result in misunderstandings and misinterpretations⁶ more frequently. Their use has a number of important characteristics that warrant further discussion.

In this study, the use of experiential/intuitive inferences about the intentions and mental state of other's appears to occur prior to more deliberate reasoning. It is only upon reflection that partners become aware of contradictory or ambiguous information about their partner's intentions. Reflection is initiated either due to a partner's challenge or self-reflections upon seeing the video recording. The content of participant's deliberate reasoning (as evidenced in the dialogue and written commentary) suggests that cues for intuitive understanding were often the partner's body language and vocal tone. The dialogue (i.e., partner disagreement with the suggested interpretation of their actions or the weight of evidence provided suggesting a more likely interpretation) suggests this information is then elaborated on with inaccurate assumptions about the meaning of these behaviours. Most partners used verbal and visual cues to draw conclusions about the content of the other's inner world. It appears that whilst these cues are useful in accurately inferring the partner's felt emotions, inferences that go beyond this and attribute further meaning to a behaviour are sources of inaccuracy and perhaps conflict escalation, due to feeling misunderstood.

1.2 Context and Behaviour. Partners formed understandings of each other's intentions using their partner's prior behaviour to predict their partner's intentions in the current situation. Partner's explanatory talk during the discussion and recollections of partner's previous explanations were used to construct understanding of the partner's

⁶ Misperception and misinterpretation here refer to different processes. Following the established tradition in cognitive psychology, perception is understood as a passive process and interpretation an active process. Respectively, a failure in acquiring data from stimuli and a failure to analyse correctly.

intentions. Participants' accounts with apparently accurate content use contextual information as evidence to establish a view of the other's intentions, and a reliance on contextual information leads to fewer erroneous conclusions. Table 24 shows examples of how both types of evidence are used to form understandings of intentions.

Table 24. Themes and quotations for how understanding intentions arises.

| Category | Themes & Illustration | |
|--|--|--|
| Evidence that partner challenges prompt reflection on intentions | 1. Resistance/circular arguments | <i>Leah: So pretty much most of the time Dan will put something in there and forget about it for about 2 weeks. And it gets really mouldy and then I can't...he is right I can't stand stuff like that. It makes me like gag. But I don't like it and so I can I ask him nicely to do it and he thinks he's always like no challenge yourself you know he wants me to like get new horizons or something and I'm like no (All) (5)</i> |
| | 2. Partner's explanation | Dan and Leah give frequent feedback to each other about the accuracy of each other's understanding of their intentions. They also expend effort in reflecting on their discussion and dialogue. For example, she is likely to be accurate that her phobic behaviour will be difficult to change, and she says: <i>To me it doesn't feel like it's something that's easy to just be like cool, I'll just do that. Whereas, to you, as as I said, you like take the viewpoint of, 'well if Leah just gets over her fear then she can decide to just do it'. So, you, you're seeing it as me not wanting to do something [rather than me being too scared of something to do it]. (Cp3, Cp4) (2)</i> |
| Evidence for the use of intuition | 1. Assumptions | Brandon when asked to account for his view of Brigid's intentions gives an account that suggests he believes she is naïve. These assumptions appear to have originated prior to the current incident with the male friend and on the basis of generalisations about other males. [The discussion had a serious and not joking tone] <i>Brigid: the same thing happened at home before we came to England like.</i> <i>Brandon: with a guy with the same name. Brigid: but with a guy with the same name but it was a smaller incident. But anyway, Brandon was like, 'You gotta stop talking to people named, you know like'</i> Later she says: <i>Brigid: Can we stop it, I'm sorry? At that point he did not make it clear that he was trying to go on dates with me (L). And like, but, the idea, like at that time. Base basically I expected him to be mad, and he was more mad than I was even expecting and so.</i> <i>Interviewer: who was?</i> <i>Brigid: You, you, like when I got back. It was like a different idea in his head of what had happened. And I was, I was, in the back of my mind I was like ok well this seems sketchy and so he's probably not gonna like it but I didn't understand the entire like / everything that he'd built up in his mind / he had built up in his mind about what I was doing with this friend (All) (5)</i> |
| | 2. Contradictory/ambiguous information | The evidence that Jenny gives does not seem consistent to Peter, and this means that he does not believe her. <i>Peter: It er... it still confuses me about the whole; If you've got your if you've got your noise playing. I, I don't</i> |

| Category | Themes & Illustration |
|---|---|
| | <p><i>see the difference in noise. Some noise that you've your making. So therefore your podcast's on. That that, that's what I can't get my head round. That if... er if you were going to sleep with utter silence then I could get my head round it. But more often than not, you're texting me when you... (laughing) off a phone which is making noise, telling me not to make noise.</i></p> <p>Later he says, pointing to the inconsistencies in what she says and her behaviour (controlling noise) <i>so yeah er I think from my perspective though it's more a case of... er of the fact that it's always it only ever applies to other people's noise. (All) (5)</i></p> |
| 3. Body language/voice tone/non-verbal communications | <p>Here we can see that Hope although she is initially unaware of using non-verbal cues, when challenged, reasons that her intuition about Jed's intentions was based on non-verbal cues.</p> <p><i>Hope: when I was talking to you the first time I didn't pick up that you weren't like, you didn't agree with me but it was really obvious then, like when I was just watching you. Hope: Um I don't know, I just feel like. You didn't say anything through that, you didn't even like have a facial expression. Which is kinda what we were talking about like. When we argue I feel like you don't care, and you didn't even look like you cared then (All) (5)</i></p> |
| 4. Intuition and Negative Emotion | <p>We see that Hope in this situation assumes that Jed does not care because in the conflict situation she has a high level of emotion that he does not share, and she feels upset. [It appears likely from his otherwise responsive dialogue, attempts to reassure Hope, and prosocial behaviours both on the tape, and those reported by Hope that Jed does care]</p> <p><i>Jed: No, I don't think I've ever shouted at you. Hope: No, I don't think you have either. I've shouted at you, but that... when we argue I get quite upset. And you... he doesn't really care. (Sad voice tone) (laughing) And I think that makes it worse for me. Interviewer: Ok, so he's not bothered about it? So how come you don't think he's bothered about you what happens then? Hope: (sighs) Interviewer: Cos you said he doesn't really care. Hope: He probably does, but erm I a get I get quite obviously upset when we argue. Whereas you try and like almost act like there's not an argument though. Do you know what I mean? (Cp1, Cp2, Cp5) (3)</i></p> |
| c) Experience of partner's behaviour over time | <p>Dan's response to Leah's account of her food phobia. <i>'I think that's what it is it's like. I love it it's great, but you always take that scientific point of view like you've just done with behavioural psychology and to me. I just, I it's as simple as 'I don't like it, please can you do this for me' kind of. It's not in terms of, 'well if I expose myself gradually like they do in studies it will be fine' you know what I mean. Dan: No, it, I do understand like I don't want you to be in uncomfortable situations that's not what I like to do. But like. Its' just that if we never, if you, if you never get over that. Then it's a problem for your whole life. Hannah: Mm Dan: Like where you just have to do like it a nasty thing once. And then you'll never have that nasty feeling again, every time you're near mouldy food. Hannah: But what you just said. It's not just gonna take one time. Dan: Well you don't. Hannah: To go fully. Dan: No, you don't know do you. But it could be that you just... Hannah: What if I just never do? And then I'm just always in an uncomfortable state. Dan: Ok so, but like I, but we could at least try, couldn't we?' (All) (5)</i></p> |
| d) References to | <p><i>Peter: I can say why. Your your parents are like quiet. Jenny: Yeah, I get this from my Dad and we literally... my Dad was always quite a light sleeper. So even when I was</i></p> |

| Category | Themes & Illustration |
|---|---|
| behaviours that arise in their Family of origin | <p><i>growing up my dad. If you like had the TV on I he'd be like, 'Turn that down. I can hear, I'm trying to sleep'. So I think that's made me a bit more a bit hypersensitive to noise around and things like that.</i></p> <p><i>Peter: Whereas 8 or 9 o'clock in the morning my Mum'd be up just putting her music on.</i></p> <p><i>Jenny: Yeah.</i></p> <p><i>Peter: Sort of thing. So I've always grown up with that. Like they always have the TV on 'til whatever time as well. So, I don't think there's any problem with with noise levels in our house at all.</i></p> <p><i>Jenny: Well I grew up in a bungalow as well. So, I've never had that experience of sound traveling up through a floor as well. So, if I went to bed at the back of the house the TV in the living room wouldn't really affect me. (Cp3, Cp5) (2)</i></p> |
| e) Context & Behaviour | <p>Here Brigid uses her understanding of the context in which she and the other male meet: they met in a collegiate context and it seems that she assumes that the context in which they met guides the relationship.</p> <p><i>'So, I made a friend here in one of my classes and he invited me out to have a drink'</i></p> <p>Jed initially understood Hope's repeated asking as 'badgering', due to the repeated nature of the behaviour and the frequent requests about his wellbeing. (Cp1, Cp2) (2)</p> |

*Note: CP**couple number, () * number of participants with the theme.*

Process 2: Revising understanding of the other's intentions. Both change and maintenance processes begin similarly, with both a rigid viewpoint, and the desire to resolve repeated challenges and discomfort associated with relationship conflict. Unlike maintenance however, revision involves genuine dialogue with the partner and incorporation of partner's feedback on intuitive guesses. This suggests that changes in viewpoint are *effortful*, requiring the person's deliberate motivation to listen accurately and to change and are not a passive process. Changes appeared to occur as a result of incorporating external information, including partner's perspectives and explanations.

Table 25. Description of each case in relation to the phases of changing beliefs about partner’s intentions.

| | Phase 1 (Challenge and Clarification) | Phase 2: (Turning point) | Phase 3 (Reflection and Accommodation) | Phase 4 (Accommodation) |
|----------------------|--|---|---|------------------------------------|
| Couple 2 (Hope) | Rigidity | Doubt/Period of Uncertainty | Downgrading of likelihood/grain of truth | Belief Revised |
| Couple 4 (Leah) | Rigidity | Dialogue about Chores in Discussion | Accommodation Orientation | Belief Revised |
| Couple 2 (Jed) | Rigidity | Awareness of Partner’s Emotional State | Motivation understood | Belief Revised |
| Couple 3 (Uzma) | Rigidity | Seeing his behaviour and hearing his account in the Recall video. | Reflection during Recall Task | Belief Revised |
| Couple 5 (Jenny) | Rigidity | Seeing his behaviour and hearing his account in the Recall video. | Reflection during Recall Task | Belief Revised |
| Couple 1 (Brigid) | Rigidity | Doubt/Period of Uncertainty | Accommodation Orientation | Belief Revised |
| Couple 4 (Dan) | Rigidity | Acknowledgement of Partner’s Emotion | Accommodation Orientation | Belief Flexed |

2.1. First Phase: Rigidity. Like maintenance, detailed below (*Process 3*), each partner initially held differing viewpoints which they tried to maintain regardless of their partner’s viewpoint (rigidity). However, many partners later became more flexible allowing the other to influence their view, again suggesting a motivated process. A typical example of a switch from initial rigidity to flexibility is, when Uzma says:

At first, I could only see why my viewpoint was correct and I was feeling determined to get my point across. I felt like my partner made some really good points and that they are very sophisticated with the way they argue their points.

2.2. Second Phase: Turning Point. The difference between situations of revision and maintenance, are ‘turning points’ where the other person is ‘noticed’, and

views are changed. These are sometimes sudden and frequently triggered by body language (or voice tone) that contradicts a ‘strongly held’ interpretation of the other’s intentions. Triggers for ‘turning points’ are often visual cues which are apparently prioritised over a partner’s verbal message. At least one person in each couple experienced this. For example, Hope notices that Jed rolls his eyes when she is talking about her being able to correctly predict his illnesses. Jenny’s intuition that led to her seeing that Peter cared, arose when she saw his body language and heard his voice tone on the *recording*. More detailed descriptions of turning points are given in Table 26.

Table 26. Quotes and detail: Turning points

| Couple | Turning Point illustration |
|-------------------------|--|
| <i>Couple 1: Brigid</i> | <p>She speaks first about an argument with Brandon concerning his suspicions about the male friend,</p> <p>‘But when I presented it, it didn’t like I was tryin’ to see like... how it like actually went, instead of jumping to conclusions’. The more salient information, based on the certainty of her statement about it, is that she feels uncomfortable around the male friend. ‘there’s other aspects of the conversation that are making me uncomfortable, totally unrelated to the relationship. I’m like this is not a good friend for me to have’. At this point it seems that she has largely revised her belief about, not just her behaviour towards, the male friend.</p> <p>A further situation then corroborates and finally changes view of the other male’s intentions: the male friend appears during the late evening at their home and asks to speak to her because he has a problem, ‘it was very stalkery’.</p> <p>When he requests they go to talk in private, ‘I was like aghhh, it was just and I was kind mad also because I had it felt like what, you know this whole, this, imagine this whole process that we’ve just condensed into nine minutes...we had gotten all of that resolved and I was like successfully distancing myself from [male friend]’.</p> <p>The evidence used here is her feelings (anger), and also her discomfort with the likely argument that it will cause between her and Brandon. The male friend then suggests directly that they should have a romantic relationship. This is where we see the final revision of her view of the other male’s intentions based on her experience with the other male in the light of comments from Brandon.</p> |
| Couple 2: Jed | <p>Jed uses Hope’s behaviour as evidence of her intentions.</p> <p><i>Jed: Well when when we were away a few years ago, it was sort of again, like the mentioning thing. It was the conversation of um, you’re not doing it to sort of badger me its cause you’re actually scared. And I think from that, cause we’ve been around people that have been ill and I’ve seen how scared it makes you. Sort of makes it a little bit clearer for me, that it’s not me its everyone.</i></p> <p><i>Hope: yeah it is everyone</i></p> <p><i>Interviewer: So, you realised that it wasn’t personal?</i></p> <p><i>Jed: No, not personal. It’s sort of a blanket, for everybody.</i></p> |

| Couple | Turning Point illustration |
|-----------------|--|
| Couple 2: Hope | <p><i>We see a period of uncertainty that follows from Hope's earlier quotation in Table 24 above.</i></p> <p><i>Hope: What were you trying to say there? I feel like I was stopping you talking.</i></p> <p><i>Jed: I think I was just repositioning that's all. I don't.</i></p> <p><i>Hope: I don't think you were. Like you looked like you were trying, gonna say something.</i></p> <p><i>Jed: Um</i></p> <p><i>Hope: You thought of something?</i></p> <p><i>Jed: I don't think so, I I think I was just shifting myself. I can't think of what I would say in that situation.</i></p> <p><i>Interviewer to Hope: Right so you looked like you felt uncomfortable. You look like you feel. So, what's going on for you now?</i></p> <p><i>Hope: Um I don't know; I just feel like. You didn't say anything through that, you didn't even like have a facial expression (L). Which is kinda what we were talking about like. When we argue I feel like you don't care, and you didn't even look like you cared then (L).</i></p> <p><i>Jed: Well, I do care. (Strong voice tone)</i></p> <p><i>Hope: No, I know.</i></p> |
| Couple 4: Dan | <p><i>Dan: Well I would be like in my ideal situation. I would like female respondent to be confident enough to be able to take the that stuff out of the bin on her own. Yeah out the fridge. If we are both just like, if we both decided we don't want it any more. Whoever's the next person to the fridge can then chuck it away.</i></p> <p><i>And</i></p> <p><i>'it's not really like my responsibility; it's like an equal responsibility. But I do understand that if it's like something like that truly terrifies female respondent to the bone, I don't want to cause female respondent to be terrified to the bone. That is obviously not what I want so if female respondent is like I will never change my feeling on this I will never'.</i></p> |
| Couple 5: Jenny | <p><i>Jenny: His admittance he already makes an effort to keep volumes low and wear headphones. First time today I properly believed he makes those efforts. (Because of being able to see him on the video tape)</i></p> |

2.3. Third phase: Reflection. Following the previous stage, partners entered a reflective stage focussed on the conflict and aspects of their own or their partner's behaviour or expressed point of view. Often aspects of behaviour or views that contradicted an initial intuitive inference were the subject of reflection. During conflict discussions whilst being video recorded, partners frequently looked away from each other and the lack of verbal information therefore may be a source of incomplete

information; this perhaps may be evident during naturally occurring disagreement situations and contribute to conflict escalation. Watching video playback however, increased participants' awareness of their partner's non-verbal behaviour, serving as an additional source of information upon which they could reflect. Video watching appeared to give partners the ability to see the conflict as a third-party. An example, in Table 27 describes how watching video feedback and viewing a partner's non-verbal signals enabled reflection.

Table 27. Quotes and illustration of reflection.

| Commentary | Quotation |
|---|--|
| Peter frequently gives information about his intentions during the dialogue. | <i>Peter: So, I just, I just know you've got an active frustration. But I it, I like, I'm I'd like to be able to resolve an issue, and I you know make it amicable for everybody. But and I'm trying to do the best I possibly can. Yet the next step is for me literally not having the TV on at all and I don't think I really.</i> |
| The trigger for Jenny changing her mind here was watching Peter's body-language and his evidence in the video that lead her to believe that Peter was making an effort to be considerate. | <p><i>Interviewer: So, has the discussion changed your mind on anything or did you notice anything that you hadn't noticed before?</i></p> <p><i>Jenny: I think the only thing I've noticed is, Peter kind of more earnestly trying to say, I do try and make things as quiet as possible.</i></p> <p><i>Interviewer: Mmhuh.</i></p> <p><i>Jenny: Whereas, I probably always sat upstairs just going, 'He just doesn't think about me. He just comes in, does whatever he wants'.</i></p> <p><i>Interviewer: Mmmhuh.</i></p> <p><i>Jenny: Then kind of seeing male respondent face-to-face, but it genuinely is on low. Just please come down one time and see how low the TV.</i></p> <p><i>Interviewer: Yeah</i></p> <p><i>Jenny: That's made me... made me think that you do make... you do at least make an effort to keep things quiet.</i></p> |

2.4 The final phase: Accommodation. During the final phase the partner's view was accommodated, that is to say, acknowledged and incorporated into the partner's understanding of the situation. People often emerged from this interactive process with a different view of their partner's behaviour to that previously held, suggesting that this is the main social process involved in belief change.

For example, Jenny writes in the written section after the interview process.

Jenny: His admittance he already makes an effort to keep volumes low and wear headphones. First time today I properly believed he makes those efforts.

2.4.1. Feeling Cared About. In addition to triggers that facilitated awareness (e.g., watching video playback of their disagreement), one aspect of context that appeared important to the willingness to accommodate a partner's way of viewing the situation and their behaviours, was feeling cared about. Frequently, partners who changed their view had recently commented that their partner cared about them or was considerate prior to revising their understanding of the other's intentions. For example, Uzma reported feeling 'they tried to put themselves into my shoes' and that Ali had pointed out the benefits to her of changing her behaviour. Of the 10 participants, eight reported (during in the solo written exercise) that they knew the partner cared about them.

Leah: He's quite cooperative and I feel that he was willing to leave the answering to me, hoping I knew him well enough to know what he was thinking/feeling. I think he tried to ensure I didn't get upset at what he was saying.

Process 3: Maintaining the original understanding of the other's intentions.

Those who changed their initial understanding differed from those who maintained their initial understanding in the type of information they incorporated into these understandings. Those whose understandings of the other's intentions changed, tended to use external information (e.g., the situational context), whilst those who maintained their understandings either continued to use their initial understanding (intuition) or they incorporated additional internal (intuitive/emotion based) understandings that

confirmed their initial understanding of the partner's intentions.

3.1.1. The Difficulty in Dismissing Intuition. Once an intuitive belief about the partner's motives and views was formed, it appeared very persistent and difficult to dismiss. Individuals' initial decision about their partner's motivation on the basis of intuition appeared to be much less likely to be updated with subsequent evidence; the initial intuitive information was more salient and partners dismissed contradictory evidence that arose, avoiding the search for evidence that would counter their assumptions and appearing to deliberately search for evidence that confirmed their initial intuition. A further analytic theme related to the understanding of another's intentions is that each partner often did not believe the reasons that the other gave for their behaviour. There is a sense that their own initial intuitive belief about the other's intentions was seen as more accurate than the partner's account of their own intentions. This dynamic appeared to generate additional conflict.

A factor that might have promoted a lack of accurate updating with external information is eye-gaze. Observations of the video play back showed partners during conflict discussions often lacked visual contact with the partner, with eye-gaze being directed away from the partner either downward to the floor or upward and to the left or right. This suggested a reliance on internal information, and it is very likely that contextual information and potential evidence from paralinguistic and non-verbal cues was not observed and may lead to maintenance of the erroneous (intuitive) viewpoint.

3.1.2. Lying. In every interview at least one partner referenced (either covertly or overtly) their partner not telling the truth. For example, Brandon's belief that Brigid was lying manifested in him checking upon her whereabouts, and Hope repeatedly, verbally

checked Jed's wellbeing as she did not believe his responses. The common factor in believing that a partner was lying seems to be that the partner's account contradicts a person's own initial understandings of the situation and their partner's motivations.

Table 28. shows the continuation of one strongly held belief and how this belief subsequently changed. In this example, initially Jenny strongly believed Peter was inconsiderate and insensitive to her preference for a quiet environment when she goes to sleep. However, during the video playback section of the cued recall process, her beliefs changed. Jenny stated that the cued-recall process gave her the opportunity to see visual and non-verbal information as a third-party and hear Peter's verbal account. Perhaps this was due to the convention of paying attention to video playback and therefore seeing additional visual information. Jenny was then able to change her mind as she saw evidence that Peter was, contrary to her initial assumption, making substantial efforts to be considerate (i.e., wearing headphones, turning down noise to a minimum, changing the type of programme he watched).

Table 28. Quotes with detail about difficulty in dismissing intuition and lying.

| Theme | Couple 5 | Couple 2 |
|------------------------------------|---|---|
| Difficulty in Dismissing Intuition | <p><i>Jenny: just as really like a small point in that what was running through my head when Peter was going well I just watch the (incomprehensible) he's really failed to mention all the times that you played stuff that is legitimately noisy so I remember being mildly kind of mmmm this is a good interesting example that you've chosen for this session but there is a lot of stuff that you do put on your phone which is kind of going (mimics phone noises) and then I go all the time cause it's always like silly little games and stuff but like according to that video you just watch nice quiet so</i></p> <p><i>Peter: I do play things with sound on but I don't think there is any problem</i></p> <p><i>Jenny: (laughing)</i></p> <p><i>Peter: Sometimes you aren't even going</i></p> | <p><i>Hope: You like.</i></p> <p><i>Jed: Yeah, squinted um.</i></p> <p><i>Hope: (Laughs)</i></p> <p><i>Jed: It's because I don't think that's true.</i></p> <p><i>Hope: Do you not?</i></p> <p><i>Jed: No.</i></p> <p><i>Hope: Why?</i></p> <p><i>Jed: Just don't. I don't think your predicaments, you have them before, but I don't think.</i></p> <p><i>Hope: I know. I've had them quite a few times.</i></p> <p><i>Jed: Yeah, but every time you ask me, there's</i></p> |

| Theme | Couple 5 | Couple 2 |
|-------|--|---|
| | <p>to sleep.</p> <p>Jenny: Well, I'm watching.</p> <p>Peter: You are sitting there, and you are playing a game yourself. And I just choose to have the sound on, because I quite like to have the sound on. I think I don't see the problem with that. <u>If you were sleeping, then I would be turning the sound off.</u></p> <p>Jenny: Yeah, I still think it's inconsiderate. (Cp5)</p> | <p>not something wrong.</p> <p>Hope: No, no, no, I know. But like, if I actually think you're gonna like have an illness I am, I am right, and I can sorta tell.</p> <p>Jed: Um yeah, I suppose.</p> <p>Hope: I could see then. You were like, didn't believe me.</p> <p>Jed: Yeah. (Cp2)</p> |
| Lying | <p>Peter: (laughing) You even think I'm lying about that though (laughing). I genuinely can't put headphones on to listen. Jenny: If I had my way, you'd wear headphones for every activity.</p> | <p>We see a number of reports from Hope about Jed's intentions throughout the interviews. Firstly, she interrupts the flow of the story to suggest that he lies (about being well when he is not and about not being cross or unhappy when he is). He automatically agrees and then dismisses this twice and redirects the conversation to the story that he was previously telling. Within the context of the discussion it seems likely that Jed is not telling deliberate lies about his own health status and negative emotional states but is just reporting based on a different level of tolerance for what is important, which Hope then reinterprets as lying. Like Brandon in Couple 1 her reasoning in this situation appears to suggest some irrationality and it is also persistent, she comes back to this belief later in the dialogue.</p> <p>Jed: Yeah, but then obviously because it's annoying me and it's annoying you cos, I'm not telling you if there's anything wrong cos there's not. You...</p> <p>Hope: You do lie sometimes though.</p> <p>Male respondent: Well yeah, but no. (shakes head)</p> <p>Female respondent: Yes you do (laughing). You just say, 'Yeah'</p> <p>Male respondent: Erm... no...yeah. But then we had a bit of a tiff didn't we?</p> |

3.1.3. *The difference between inaccurate and accurate intuition.* Whether erroneous understandings of their partner's intentions are changed or maintained appears to be based on whether intuition or deliberative thought is used as the on-going basis for beliefs about the partner's motivation, intentions and perspective. Intuitive

accuracy appeared to result from an individual's ability to engage in deliberative thought processes in addition to more rapid, experiential understandings, and to engage with the partner's dialogue even where it differs from their initial understanding, incorporating information from the external environment and knowledge of the partner's prior behaviour to revise their understanding. In contrast, those who maintain inaccurate beliefs about their partner's motivations or intentions, draw inferences about the partner's '*life-world*' based on their own experiences, beliefs and current emotional state, and therefore draw erroneous conclusions about other's intentions and viewpoint.

It appeared that accurate inferences regarding the other's intentions were important in understanding the partner's subsequent behaviour and that feeling well-understood tended to lead to de-escalation of the conflict, whereas feeling misunderstood tended to escalate conflict within the relationship. Given the impossibility of direct access to another's '*life-world*' and that for social affiliation, the accurate representation of other's beliefs is important (Mercier & Sperber, 2011), it is possible that people have anxieties based on a perception of a deficit in the functioning of their 'intuitive system'. For two of the participants, Hope (Cp1) and Brandon (Cp2), anxieties about their ability to form accurate, implicit understanding of their partner's intentions, motivations and state, appeared to be a source of distress. This is evidenced by their frequent enquiry about their partner's wellbeing or surveillance of their partner's whereabouts.

Question 2. How do Irrational Beliefs Arise, and how are they Maintained or Changed?

This section focuses on irrational thought processes that evolve during conflict or that are the focus of conflict, and the influence these processes have on the self, the

partner and, subsequently, the relationship. Three main processes emerged: the relationship between anxiety and difficulty in dismissing intuition-based irrational ideas; gendered differences in partner's accommodation of irrationality; and some apparent functions of irrational thoughts, including the transfer of responsibility and deferential incorporation.

Summary. The dialogue and written pieces have answered the first question about the process of development and change of each person's understanding of other's intentions. However, as there was no discussion by any of the couples about how their irrational ideas (e.g., about food contamination) arose, and also no revision of these irrational beliefs during the research process, couple discussions failed to generate answers to the first research question - How do irrational beliefs arise, and change?

However, in all cases partners held some ideas that appeared to the partner, the research team, and often the belief-holder themselves as irrational. In each case, these beliefs were the focus of the conflict discussion that partners brought to the study. Belief holders differed in their awareness of the rationality of their belief, in general, women appeared to be more self-reflective and were more likely to feel that their belief was irrational even whilst continuing to believe it. Over time, partners had devised two basic ways of dealing with their partner's irrational beliefs; either using behavioural or cognitive accommodation (discussed later in this section). Dealing with their partner's irrational beliefs however, still appeared to be a source of frustration and anxiety. A notable difference was that females with irrational ideas seemed aware that their beliefs were not logical and were at least somewhat irrational. Whereas males either were not aware of this or did not acknowledge the irrationality. Some implications of this are

discussed below.

Process 4. Difficulty in dismissing irrational intuition-based beliefs.

Irrational beliefs appear to emerge from a combination of earlier intuitive understandings and negative emotion (e.g., anger or anxiety). Irrational beliefs were maintained by an inability to dismiss initial beliefs arising from intuitive understandings of the situation. Intuition that originated in social anxieties about being able to correctly infer other's intentions, or where the person is experiencing negative emotions (e.g., frustration or anxiety) appeared to be more difficult to dismiss. Two of the cases demonstrate this dynamic clearly: Couple 1—Brandon's exaggerated and therefore irrational ideas about the threat posed by his girlfriend's male friend; and Couple 2—Hope is anxious about her ability to understand Brad's internal states. As mentioned above, some participants with irrational beliefs seem aware that these ideas are unsupported by reliable evidence, and reference this in their dialogue, whereas other participants appear to show no awareness. Upon further analysis, a pattern emerged regarding those who appeared aware or not aware of the irrationality of their beliefs (see Table 29). When a male held what seemed to be an irrational belief, e.g., about their partner's motivations (i.e., unlikely given the presented evidence), he appeared to be overconfident in his belief, showing no awareness that his belief was likely to be untrue. However, females, in all cases, acknowledged that their beliefs might be erroneous, referencing the lack of evidence. Whilst I acknowledge that this is a very small sample, the pattern is nonetheless interesting.

Process 5. Accommodation.

5.1. Phase 1: Accommodation orientation and the focus of conflict.

Interestingly, the reasoning that occurred during each couple's discussion focussed on

the apparent lack of evidence for a strongly held belief of one partner. In each case the partner with the belief that appears to fit the available evidence better (from here on called more rational) made attempts to change their behaviours, or the situation, in order to accommodate the partner with irrational beliefs. Whereas, the partner with more unfounded beliefs made fewer concessions to their partner. This suggests that irrational ideas may have a social function that involves influencing or persuading others.

Accommodation manifests as changes in either behaviour or in cognition (where the partner's beliefs are incorporated into and often supersede the other partner's original belief). Table 29 summarises this process. Firstly, where one partner has a belief that is unlikely on the basis of the evidence presented (which from here on will be called irrational), it is the other partner, regardless of gender, who attempts to accommodate the partner with irrational beliefs. Secondly, the table shows males (without exception) are overconfident in their judgement, believing themselves to be right, even when their beliefs are wholly or partially ungrounded in the available evidence. Finally, in terms of accommodation within each relationship, male partners accommodate their partner by making behavioural changes on the basis of their partner's opinion; however, they maintain awareness of the female partner's beliefs as irrational. Whereas, female partners try and accommodate the beliefs of their partner; and their apparent underconfidence in their judgment *per se* often leads to deferring to the male's perspective and surrendering her own judgement of what is 'real'.

Table 29. Patterns of partner accommodation, and awareness of irrationality.

| Couple | Female | Male | Who Accommodates? | Thinks the person who is thinking irrationally is irrational | Believes themselves to be right |
|-----------|------------|------------|-------------------|--|---------------------------------|
| Couple 1 | Rational | Irrational | Female | No | Male |
| Couple 3 | Rational | Irrational | Female | No | Male |
| Couple 2 | Irrational | Rational | Male | Yes | Male |
| Couple 4 | Irrational | Rational | Male | Yes | Male |
| Couple 5: | Irrational | Rational | Male | Yes | Male |

5.2. Phase 2: Safety behaviours and transfer of responsibility. Erroneous thinking appears to be maintained by two further linked processes that could constitute safety behaviours (Clark, 2001). The transfer of responsibility for dealing with a problem to the partner, and *deferent incorporation*.

Transferring responsibility appears to function in a way that merits additional discussion as it arose frequently. Participants talked about behaviours that they engaged in or encouraged in their partner; these might be understood as ways to reduce the anxiety and distress which occurs as a result of their irrational beliefs (some of which have already been mentioned in this analysis). Brandon (Cp1) used frequent checking on Brigid in order to manage his anxiety. Similarly, Hope (Cp2) uses checking upon her partner's well-being, in order to manage her anxiety about her partner. Hannah (Cp4) encouraged Dan to remove potentially out-of-date food in order to reduce her anxiety. Ali's (Cp3) constraint of Uzma's spending serves to reduce his anxiety about money. Each of these behaviours lead to a reduction in anxiety/distress for the individual who is perceived as holding the irrational belief. While reducing anxiety by altering the behaviour of their partner, they reduce the likelihood of conflict that may occur from

directly challenging what they believe to be irrational thinking (see Table 30).

Accommodation of the other's beliefs by one partner appears to enable partners with an irrational belief to transfer responsibility for managing either the source of fear or the feelings generated by the irrational belief to their partner.

A second process, cognitive accommodation, is discussed in the following section. When a female partner accommodates her partner's irrational belief, she changes not only her behaviour but also her beliefs to align with her partner's irrational belief and thereby comes to believe that she is responsible for the problem. An example of cognitive accommodation is illustrated in Table 31.

Table 30. Types of accommodation and the relationship to safety behaviours.

| Couple | Fear | Behavioural accommodation | Cognitive accommodation |
|----------|--|---|---|
| Couple 1 | Fear that partner will be unfaithful | Female partner stops seeing male friend to reduce males fear. | Female comes to believe that male friend is a threat to the relationship and is not a good friend |
| Couple 2 | Fear that others are unhappy or unwell | Male gives excessive reassurance to help manage her fear. | Male understands that she is irrationally afraid. |
| Couple 3 | Fear about lack of money and spending | Female curtails buying of items that partner thinks are excessive to reduce her partners fear. | Female comes to believe that her (which on the basis of all aspects of the evidence presented by the couple. i.e., she lived separately from her boyfriend with her parents, had separate finances, her own adequate income, and spent on a few items such as an extra pencil-case in a way that if occasionally frivolous, appeared moderate and controlled) spending might be excessive or problematic. |
| Couple 4 | Fear of out-of-date food. | Male disposes of out-of-date food from the fridge so that she doesn't have to feel afraid. | Understands that her fear is irrational. |
| Couple 5 | Sensitivity to noise. | Male limits noise making by wearing headphones and turning down volume so that she does not feel annoyed. | Believes her sensitivity to be excessive and irrational. |

Table 31. Examples of Behavioural and Cognitive Accommodation.

| His Initial Position | Her initial position | Accommodation and Transfer of Responsibility |
|--|---|---|
| <p>He says, 'She, she <u>spends</u> <u>reckless</u> amounts of money. So, she'll see something er she'll want it she'll see something that she's wants. It it's just <u>erm</u> <u>continuously spending money</u>. <u>More and more money each day</u>, and I don't think it's very good. And she should, stop spending so much, so quickly'. Furthermore, he says: <i>she like without thinking you were just gonna buy it straight away</i>. Ali appears to believe that she lacks self-discipline and control with her spending. <i>And I think it'd be like a good, it would be a discipline your spending as well</i>. He mentions lack of self-control and discipline on six other occasions during the interviews.</p> | <p>She says: <i>But I don't buy things that don't benefit me</i>. However, from the description of her spending in the text it appears that she is buying a few non-essential items such as pencil cases, and some clothing, and food treats with her work money. Uzma's initial view of Ali's intentions is that: what was going through my head at the moment like, 'Oh do you want me to live like a minimalist?' And later in the transcript, <i>F: I don't think he misunderstood.</i></p> <p><i>I: Ok</i></p> <p><i>F: I just I just think he can't think of any other times that I've spent recklessly. Yeah.</i></p> <p><i>M: She thinks that I was just pinpointing that one occasion, rather than it's being...</i></p> <p><i>F: Being generally.</i></p> | <p>Firstly, she says, <i>I try not to be reckless</i>. Then she positions herself as irrational, and not thinking.</p> <p>M: She's like, I don't feel like anything now but if I see it again, I might feel something, (L) about the pencil case.</p> <p>F: if I see that pencil case again, I think I might be like inclined to buy it. If you don't stop me, then I'll just be like 'oh I think the pencil case is calling me. I need it'.</p> <p>She starts to agree with his assessment of her after having resisted it before. She here agrees that she is buying things without thinking. Later she says: <i>'I just buy it because I think they look good but then I don't like I don't think things through when I'm buying them, I think in the moment. So, yeah that's where I think I am reckless, because I buy it even though I don't need it necessary like want it. I just buy it because it looks nice'</i>.</p> |
| <p>There is an extended section of dialogue in the interview that demonstrates this well. It starts with Brigid confronting Brandon about his use of 'it was a long time ago',</p> <p>to refer to the argument that they had just had which she disagrees with.</p> <p><i>Brandon: I think so like...I don't know I don't really remember it was a long time ago (Laughs)</i></p> <p><i>Brigid: I guess (incomprehensible) we had little arguments</i></p> | <p><i>Brigid: Ok sorry can we stop. It's... we legitimately did not have like the resolving conversation about it until like two nights ago. Like it...</i></p> <p>Here he agrees with her and then she works to give him a reason. This uses her intuitive reasoning (hunch) about what his 'a long time ago' could have referred to, but it is clear from the transcription that they were talking about the argument.</p> <p><i>Brandon: No.</i></p> <p><i>Brigid: It was the the actual end of the, my friendship with that person that was like a month or so ago like. So, it felt...</i></p> <p><i>Brandon: Yeah.</i></p> <p><i>Brigid: A long time ago. We've, we had kept talking about it as, and still trying to kind of figure it out until like super recently. So, I thought it was funny that he was just like, (mimic) 'Oh that was back in the day'. (L)</i></p> <p><i>Brandon: Well it like the main. Like that issue of it was... uhm... because you know it was</i></p> | <p>Here he changes the subject from the timing of an event to his feelings and understanding of the situation. Brigid then works hard again to intuit and understand what he is talking about that could explain his voiced perception that the argument ended a long time ago.</p> <p><i>Brigid: So, you're talking about like the scene that we were discussing?</i></p> <p><i>Brandon: Yeah.</i></p> <p><i>Brigid: Oh ok s... I just misunderstood sorry.</i></p> <p>She apologises, taking responsibility for the situation and the misunderstanding. The conversation then changes to implicitly use a principle known as state dependent memory, which is likely that the male partner of the couple has encountered as a result of the female partner's studies, as evidence that she would remember it accurately where she would not. In this situation it appears that Brigid's doing of most of the relational work (to understand Brandon, initially using intuition, then using a rational reasoning</p> |

His Initial Position**Her initial position****Accommodation and Transfer of Responsibility**

something that I was frustrated at, but like once I understood it better.

style, and evidence gathering) evolves into a situation where she appears to be the one who is thinking irrationally and takes responsibility for misunderstanding him.

Brandon: Uhm but like, I feel like you would remember it more because it was a more stressful situation because you know you uhm...conversations with your mom can like end up really at polar ends of the scale.

Brigid: Yeah so it like there was already, gonna in my brain there and then.

Brandon: Yeah.

Brigid: Add another factor into it.

Brandon: So, then there was the fact that I'd called so many times. (F L) And then...

Brigid: It was seven times (L)

Brandon: Uhm and then you know there was the situation that you were... and where you were at his flat and.

Brigid: Yeah, 'cause

Brandon: Your Mum was talking to him as well and being super excited about that.

Brigid: Yeah and the way that I said it was like (exaggerated voice,) 'Oh I'm in his flat', not 'hey we're in a group study room its part of the school, but it just happens to be in the apartment building'. Like that is what I should have said. But what I was like was like (exaggerated voice) 'Oh I'm in my friends flat and we're on Skype', like (L). It just was not correct.

Brandon: And so, I feel like you remember it more just because you were under the higher stress of the situation.

Brigid: That's true I mean like that... the talking about the ...how, how in a certain state you have different like... you remember something better if you're in the same state. So, it...because I was stressed out then and because it was like a more stressful situation. Next time that we would get into a fight or a conflict about something it kind of brought it back up as

His Initial Position

Her initial position

Accommodation and Transfer of Responsibility

well. Or, or if we would try and even just talk about it, I would get really like flustered and it made the situation worse probably...

Question 3: How are Partners ‘Positioned’ in Conflict Discussions, by Their Partner’s Irrational Thinking or Erroneous Beliefs Based on Intuition?

In each dialogue partners disagree about the nature of the situation. This disagreement has two forms—firstly where one partner acknowledges the other has a perspective that contradicts their own, and in contrast, where the partner’s ability to reason and accurately derive meaning from other people’s behaviour is put into question and their testimony itself is seen to lack credibility. For example, in the dialogue in Table 31, it is not just her differing perspective but Brigid’s ability to reason itself is put into question by her partner.

6.1 Phase 3. Deference incorporation, accommodation, and coercive belief reconstruction. In contrast to the behavioural accommodation process detailed above, a more covert accommodation process, which I named *deference incorporation*, evolved during the interviews. Most partners as illustrated above, after initial resistance to the partner’s position, try to accommodate their partner’s views and to consider how to accomplish an outcome that both partners consider satisfactory. How ‘accommodation’ is accomplished (i.e., either behaviourally or cognitively) determines whether both partners are seen by each other and themselves as capable of rational thought with regard to their own and other’s motives, and reality.

Males’ consistent overconfidence in their judgement and belief that they were right despite the absence of sufficient evidence to corroborate this, in combination with the female’s choice of empathic approach, appears unproblematic where the partner’s

belief was benevolent and grounded in reality. Where this overconfidence/empathy dynamic appeared to be problematic, however, was where a male partner erroneously asserted his insufficiently evidenced, negative attributions about his partner (i.e., interpretations of her behaviour, thoughts, or emotions which (in the opinion of the researcher) are likely to not be in the female partner's best interests to agree with and cognitively accommodate. This process appears complete when the female partner has accommodated the (male) partner's beliefs, by subsuming her own interpretation, and believes his interpretation of herself and the situation. This process appears to be a functional behaviour for the male, as it appears that responsibility for his distress has transferred to the female partner.

Conversely, whilst the cognitive accommodation process of deference incorporation, described above, appears to be functional for the male, it seems potentially dysfunctional for the female partner. This is because cognitive accommodation means giving up one's own beliefs about what is real (i.e., ability to have accurate insight into one's own or another's motivations and knowledge of one's own identity) for one that is no longer grounded in this reality.

6.1.1. Period of confusion. Where an individual tried to accommodate, what they felt to be, a partner's irrational viewpoint, they reported confusion and an inability to think clearly. This was reported by couples one, three and five. It is conceivable that trying to reason with a partner's irrational thoughts created a sense of doubt in their own ability to reason effectively. Confusion is a lived experience that was reported to accompany the transition between their partner's lack of accurate understanding and the development of a felt sense that their own ideas and rationale were not comprehensible

(to themselves or another). This experience is common to both types of accommodation, but only some partners appear to adopt a belief that what they are saying is incomprehensible. We see an example of this in Table 32.

Table 32. Example of confusion.

Peter: It er... it still confuses me about the whole; If you've got your if you've got your noise playing. I I don't see the difference in noise. Some noise that you've your making. So therefore, your podcasts on. That that, that's what I can't get my head round. That if... er if you were going to sleep with utter silence then I could get my head round it. But more often than not, you're texting me when you... (laughing) off a phone which is making noise, telling me not to make noise.

Process 6: Sense of not being able to make oneself understood.

To some extent everybody apart from Uzma in couple 3, described not feeling understood by their partner. In three of those cases (Cp1, Brigid; Cp2, Hope; Cp5, Peter) participants comment that their experience or thinking differs from that of other people and is not normal. They have a sense of alienation from what they believe to be normal experience. After being misunderstood, participants describe lacking words with which to make themselves comprehensible to their partner and to the interviewer, and felt they weren't thought of as providing credible information. This is reflected in their dialogue which appears to be less reliant on evidence as time goes on.

Being credible and understood by their partner and the interviewer, was felt to be important to respondents; and it was apparent that being deemed untrustworthy and being misunderstood was a source of distress. Two ways in which participants described not being able to make themselves comprehensible emerged from the data. We see examples of this in the following quotes in Table 33:

Table 33. Example of not being able to make oneself comprehensible.

Hope: Like when I was like, 'oh you understand now'. Whereas before I was just, you just thought I was annoying you. I didn't know you were.

Jed: Oh yeah. We established that a few years ago, well last year.

Hope: Yeah, I know but like, it's not something I understand. Because I have never met anyone else that's scared of other people being ill like. People are scared of like getting illnesses, themselves like germs and stuff. That doesn't bother me. People are scared of like of sick. I'm scared of the person, like people being sick. But I'm not, like sick doesn't bother me. So, I don't, I don't expect you to understand it. So, I wasn't sure when I said that. Whether like...you did.

Jed: Yeah, I get it.

In the written section Jed says

Jed: I don't think Hope believed what I was saying fully. I also felt as though I could not explain myself properly and (she) occasionally finished my answers for me. (Cp2)

The dialogue suggests that the felt sense of being comprehensible in partner-conflict has a social dynamic aspect. That being comprehensive is an interactive process that is not only intra-psychic but is preceded by a partner's lack of understanding of one's point of view. It is not that someone starts as incomprehensible, but that they come to believe that they are so, due to being misunderstood by their partner. This felt sense results from the partner failing to accurately acknowledge or respond sensitively to their point of view, or the imperative suggested by their point of view. It is this dynamic that leads to a sense of not being believable or comprehensible.

Discussion

Summary of Findings

This study is the first using cued recall methodology to investigate how people in non-abusive relationships understand each other's intentions, how irrational thinking is managed during conflict discussions, and what impact each process has on the relationship.

Three main findings relate to how participants perceive and process social cues and mentalise in couple conflict situations. Differences in empathy processes appear to determine whether a partner's intentions are understood more or less accurately and

rationally; irrational ideas are more likely to form when people judge their partner's intentions using unchecked intuition, their own negative affect, and their own unchecked assumptions about partner's non-verbal cues. Participants who hold irrational ideas are also less inclined than partners with more, apparently better evidenced bases for their held beliefs, to revise these beliefs based on their partner's behaviour. These findings are consistent with lack of belief revision in those with current psychotic ideation that are outlined in cognitive models of psychosis (Broome et al., 2005; Garety et al., 2005, 2007).

Secondly, irrational thinking and belief rigidity was reported by at least one partner in each couple and was qualitatively similar to that found in individuals who experience delusions as a result of early psychosis (Broome et al., 2007). Finally, irrational beliefs appeared to function to enlist the partner's assistance in avoiding anxiety-provoking situations, either by soliciting practical assistance from the partner or by minimising challenge to rigidly held beliefs. Varying strategies were employed in the management of irrational thoughts expressed by a partner. Such strategies could be seen as functional behaviours with the likelihood of immediate (in the discussion) and longer term (within the relationship) rewarding or punitive outcomes. In addition, some participants reported that upholding their own irrational ideas reduced their levels of anxiety. This research contributes towards knowledge by exploring how information is prioritised and integrated within a conflict situation in order for a partner's intentions and motivations to be understood. In addition, it highlights the type of information that may be ignored by a partner when inaccurate social cognition occurs.

What is clear is that partners thoughts are substantially altered during couple

conflict and that the social processes, outlined in detail above that arise and evolve during conflict, give rise to both rational and irrational beliefs. These alterations in belief appear to arise from alteration in social cognitive processes (e.g., empathy and intuition) that are important to social affiliation (Mercier & Sperber, 2011) and that therefore have a clear role in adaptive social functioning. Furthermore, the processes of strategic social influence (Kramer & Messick, 1995) that evolved during partner conflicts, have the potential to result, not just in behavioural changes, but in belief changes. This suggests that irrational beliefs may be functional behaviours (Carr, 1988) and when combined with negative (social) attributions about the partner, they may also be coercive or abusive.

How and when do People come to Understand each Other's Intentions During a Conflict Situation?

Meneses and Larkin (2015) suggest three social cognitive processes involved in empathy: intuition (characterised by its reliance on nonverbal and unintentionally communicated experience); sharing (an experience of 'we' promoted by identification or sharing of something in common with the other person); and imagining, which draws on intellectual resources to represent the experience of the other person. Meneses and Larkin (2015), suggest empathy consists of a number of sub-processes, and accurate understanding of another depends on which of these empathy processes is used.

Although all partners employ empathic processes, the choice of evidence on which to base assumptions about the other or cross-checking initial thoughts, determines those whose empathy and intuition are more or less accurate. Those who form more accurate initial understandings of their partner's intentions and behaviours base these understandings upon evidence of their partner's previous behaviour and accumulated

knowledge of their partner's prior motivations, as opposed to relying upon body language and vocal tone information in the current situation. In order to revise their beliefs about their partner's intentions, those with more accurate understandings are also able to listen to and incorporate the partner's views about their own (the partner's) motivations. These differences in evidence-base and the process used, lead to the dismissal of (implausible) suspicious thoughts rather than escalation of the conflict situation. It appears that empathic accuracy is impeded because those who form irrational ideas over-rely on intuition and internal cues for both initial understanding and review and they do not perform fact-checking reviews using new external information. These findings accord with previous research that suggests that the social cognitive processes central to social relationships are impaired in psychosis, in particular empathy (Blakemore & Frith, 2006; Brüne, 2005), and accurate inference of others' thoughts and feelings (Bentall et al., 2009) commonly called empathic accuracy (Ickes & Tooke, 1988).

1. The role of intuition.

Previous findings suggest people over prioritise nonverbal information during empathic processes (Menenses & Larkin, 2015). The current study found this is not just due to focussing on nonverbal cues themselves, but to an over-reliance on initial, emotion-based interpretations of nonverbal cues. In addition, the failure to revise beliefs and integrate other contextual information, for example a partner's prior behaviour and subsequent nonverbal cues. It appears that priority is given to nonverbal information experienced during concurrent negative emotional states and over prioritisation of intuitive beliefs under these conditions that results in persistent irrational beliefs about the partner's intentions.

According to Ma-Kellams and Lerner (2016), folk understanding of intuition is that it helps to accurately infer the feelings of others. The results reported above however, show that a reliance on unchecked intuition was the main source of both unfounded assumptions about a partner's intentions and of the maintenance of those assumptions. Two factors in this study, strong negative emotion and over-reliance on unchecked nonverbal cues, appeared to interact to reduce empathic accuracy. Prior research shows that negative emotion is partly causal in creating and maintaining erroneous assumptions (Thewissen et al., 2011), which suggests empathic accuracy may only be impaired when partners use intuitive thinking whilst experiencing strong negative emotions, which would account for previous mixed findings about whether intuition-use improves or worsens empathic accuracy reported by Ma-Kellams and Lerner (2016) in their review of prior findings.

What Factors Determine when Inaccurate Interpersonal Understandings are Revised and when they are not?

Intuitive assumptions are often confidently held (Thompson et al., 2013; Topolinski & Reber, 2010), as processes giving rise to intuitions tend to be fast and fluent and this experience has been found to engender a sense of confidence. The current study suggests this confidence leads to a failure to review intuitive understandings of the partner's intentions. Although all people are subject to erroneous beliefs at some point (Bortolotti & Broome, 2008), understanding the intellectual processes involved in fact-checking in social understanding is an important target for research (Freeman et al., 2012). Most partners in this study employed rational thinking in order to evidence-check intuitive insights. Fact-checking appeared to result in belief flexibility and was a motivated behaviour, driven by repeated challenge, empathic

effort, and focus shifts in empathic process from imagining to understanding. Repeated challenge during conflict leading to questioning of the veracity of participants' views, was a source of ambivalence and prompted evidence-checking and revision of inaccurate beliefs. Some partners then deliberately switched from a directive process (leading the discussion and assuming that the other's experience was the same as their own) to an empathic one (clarification of their partner's point of view or feelings about the relationship or situation). This deliberative change of focus enabled incorporation of previously unnoticed aspects of the other's experience or emotion or nonverbal information about the context or the partner's emotions.

Consistent with Stein (1917/1989) who concludes that intellectual fact-checking is part of the process of empathy, and that accurate, intuitive, direct experience must be complemented by additional intellectual thought, this study suggests intuitive thoughts are revised when they result in inaccurate assumptions. This could occur when individuals acknowledge that their own past experiences have led them to draw inaccurate inferences about their partner's behaviour, and they then go on to fact check their assumptions. As Stein's is the only account that incorporates the idea of fact-checking as an important component of empathic understanding, our findings suggest theoretical accounts should be revised to acknowledge the importance of this process.

Failure to employ rational thinking partially accounts for belief inflexibility in psychosis (Garety et al., 2005). Not updating beliefs on the basis of subsequent, pertinent information, which might also be thought of as a confirmation bias (Wason, 1960), appears to distinguish between those who hold merely erroneous beliefs from those whose are irrational or delusional (Freeman, Lister, & Evans, 2012, 2014).

Further experimental research is needed to investigate the relationship between flexible views and motivated empathic effort. Furthermore, research on empathic effort with populations likely to be more severely impacted by inflexible views, should be conducted using the cued-recall methodology validated in the current study.

2.1 Emotional information.

The most important contributor to empathic accuracy emerged as the ability to notice and understand emotional information. Analysis of participants' turning points in the current study showed that partners could more accurately understand the motivation and internal world of their partner when they integrated information about the partner's emotional state; updating their initial intuitive response by observing non-verbal or vocal tone cues, or attending to information in the partner's dialogue. Previous findings suggest people with higher scores on a number of measures of psychosis show a preference for experiential (emotion-based and intuitive) rather than rational thinking (Freeman, Evans, & Lister, 2012), and hold greater confidence in experiential-based beliefs once formed (Simmons & Nelson, 2006). However, ignoring pertinent emotional information both about the partner and oneself, particularly a lack of awareness of the adverse impact on interpersonal reasoning of their own anxiety (Garety et al., 2005), seems to lead to an inability to correctly infer a partner's internal state, as well as rendering participants' own experiences incomprehensible.

Although irrational thinking may originate in intuitive processes, our findings suggest that misunderstanding and irrational social cognition is driven not just by prioritisation of imagination over sensory information (Freeman et al., 2012), but more specifically, by the lack of ability to reason about negative emotional states and the subsequent escalation of said states. Firstly, an erroneous focus on their own emotional

experience, followed by an unawareness of the impact of this on their ability to rationalise, and lastly, the inability or unwillingness to attend to the others person's emotional cues. This finding supports those of Chapters 3 and 4 that intensification of emotional responses precedes irrational cognition and invasive and aggressive behavioural responses in the jealousy syndrome.

How do Inaccurate and Irrational Thought Processes Influence Conflict?

The results in each case showed that irrational beliefs appeared to be at the core of partner conflicts. Interestingly, the findings are congruent with both major theoretical accounts of belief inaccuracy, i.e., that conflict is due either to a lack of self-awareness of one's own inaccuracies, or to an awareness of the discrepancy between one's own belief and reality but failure to revise beliefs due to unconscious motivations (Thompson, Prowse-Turner, & Pennycook, 2011). Whilst partner challenges were a factor in belief change, they conversely resulted in a range of tactics designed to maintain an erroneous belief. Most partners in non-abusive couples sought to accommodate their partner's irrational beliefs, including making personal (i.e., either behavioural or cognitive) changes to accommodate them. However, the forms of the partner's changes, identified here, have different theoretical and practical implications. Where the male partner held an irrational belief the type of change that he made to accommodate his partner, suggested a lack of awareness. Furthermore, the role that these irrational beliefs play in stimulating change to a partner's belief or behaviour, also suggests that they may function as safety behaviours, and consequently help to maintain irrational thinking. These processes do not appear linked as they function independently. In agreement with prior research, irrational beliefs may have perceived positive consequences (Bentall, 1992) (this idea is addressed in the final section of this

discussion) by encouraging partner responsibility-taking for the management of the other's fears.

3.1 Deference incorporation.

The findings here suggest that social cognitive processes are involved in the formation and maintenance of some beliefs. In order to retain a sense of their own credibility, rationality, and social sense-making, people in this study appear to rely on their partner's endorsement of their sense-making. Where their account is treated by the partner as incredible, after a preceding period of confusion, participants suffered a loss of certainty in their ability to accurately comprehend social situations, in particular in understanding their own and other's motivations. This experience was accompanied by a reported sense that they were *weird* or abnormal. These experiences were reported as more intense by those who were more anxious. Accounts of psychosis frequently report a sense of alienation that accompanies psychosis (Vass et al., 2015). The current findings suggest a qualitative relationship between lack of social endorsement and feelings of social abnormality or alienation that warrants further exploration.

Beliefs were revised to match a partner's erroneous beliefs only in situations where the partner held an unjustified level of certainty in their unfounded interpersonal belief and in addition failed to reciprocate empathic effort. Accommodation might be generally thought of as an adaptive process (Simpson & Campbell, 2013). However, it appears here that in attempting to accommodate the partner, a person may lose sight of their own better-evidenced view and perceived ability to make sense of the world. It appears that, in certain circumstances, normally adaptive social processes, which relate to our ability to form social affiliations (Boyer et al., 2015), such as empathic effort and belief flexibility, may have potential negative outcomes. Additionally, a potential

relationship between lack of empathic effort and unjustified levels of certainty in false beliefs is suggested that needs further exploration. Experimental research should aim to determine whether increased empathic effort reduces unfounded suspicions and other delusion-like beliefs and, furthermore, how empathic effort be encouraged in people with a rigid viewpoint.

The ability to revise a partner's belief appears to be functional and can be understood from a number of perspectives. One suggested purpose of false belief in mental health and psychosis has been that it helps people achieve goals or promote their well-being (Craigie & Bortolotti, 2018). In the current study, irrational beliefs appear to result in indirect safety behaviours (Clark, 2001) by inviting the partner to take responsibility for managing their (irrational) partner's fear. As a form of safety behaviour, it prevents the processing of contradictory evidence and helps maintain an erroneous social belief. The process can be viewed also from a critical feminist perspective, in that 'deference incorporation' here enables the replication of structures of male dominance. In every case it was the female partner's beliefs that were more malleable and therefore subject to revision. Also, females were positioned as being less credible or as irrational by their male partner. This power dynamic perpetuates a view of females as less rational and therefore unable to perceive 'reality' accurately, which replicates structures related to the social status of females. The belief-change process described here and involving empathic effort, appears coercive and has much in common with folk-psychological and psychotherapeutic ideas of gaslighting (e.g., Calef & Weinshel, 1981) and perspecticide (Stark, 2009) which describe the manipulation of an individual's thought processes in order to harm them and derive personal benefit.

However, the concepts of gaslighting and perspecticide cannot be seen to fully capture the current findings. Theories of gaslighting and perspecticide (Calef & Weinshel, 1981; Stark, 2009) suggest that self-doubt arises due to manipulation of the external environment. Instead the research here finds it is the female's internal environment that is manipulated. Men's greater (even if unjustified) certainty in their beliefs is used strategically to claim correctness for their viewpoint, and this results in change, not just in the woman's behaviour, but in her belief about herself and the couple's interpersonal reality in order to meet his social needs. The woman's doubts about her own experience arise due to the manipulation of ideas (self-knowledge) internal to the female, over which she should be able to claim epistemic authority, as the direct knower. The woman's need for affiliation appears to be prioritised by her and used strategically by the male. This in combination with the use of traditionally 'feminine' skills, empathy and intuition, appears to result in the strategic use of these skills against the woman. Therefore, it is possible that these skills, important to social affiliation, have the potential to become dysfunctional in some situations. For example, in conflict where another person uses strategic attacks (negative attributions about the partner's motivations or behaviour) to promote their own beliefs and agenda. We saw in the case of Brandon and Brigit the strategic use of this process resulted in the termination of Brigit's friendship with the perceived rival. Thus, this type of influence has more in common with a Foucauldian sense of power than the direct manipulation suggested in gaslighting and psychological coercion accounts.

Furthermore, from a traditional psychological perspective, belief rigidity has negative connotations. However, taking a critical feminist perspective, the rigidity of thinking displayed by male partners (i.e., the belief that they are right), serves a

protective function in couple arguments. Whilst behavioural accommodation is adaptively flexible, their lack of cognitive flexibility appears to make males less susceptible to the belief revision processes outlined here.

The phenomenon described here further differs from gaslighting and coercion; manipulation is more subtle, at no point is there a direct threat, or obviously intentional manipulative/coercive act. The strategic process is solely aimed at the subtle, strategic alteration of belief. The process nonetheless achieves the result of maintaining an unequal balance of power and privilege, with the male partner maintaining his epistemic privilege regardless of the actual credibility of his claim. Also, in all cases, the female partner is positioned as irrational or mistaken, and her credibility as a ‘knower’ is dismissed. The process goes beyond the feeling of doubt and uncertainty outlined above (i.e., where the partner believes themselves to be abnormal), as the female partner appears to no longer question the credibility of the erroneous belief incorporated from her partner. This might be read as a form of testimonial injustice (Fricker, 2009), in that the account of the female partner is not held as credible and is dismissed. However, it appears to go beyond this as the female also comes to be portrayed as irrational. A useful concept is Rae Langton’s (1993) idea of silencing, like Fricker’s epistemic injustice, silencing functions to remove resistance and perpetuate power injustices. Whilst it is no longer acceptable in many societies to ignore someone’s view just because they are a woman, Langton (1993) suggests in identifying any individual as oversensitive or crazy, the perpetrator⁷ of silencing destroys the credibility of the victim by holding the role that they inhabit as one that is not considered a legitimate voice, and

⁷ Perpetrator refers to the author’s original wording.

which therefore can be ignored.

I suggest that the dynamic described here goes beyond *silencing* or *testimonial injustice* and causes a person to doubt their ability to understand the world, what might be understood as a definition of madness. It seems a person's (here the woman's) views are revised so that her understanding of the situation, her behaviour and motives, and her partner's behaviour and motives are destabilised. By deferring to another's view (she) comes to view them in the same way that the other person (here the male) does, even when it is probable that the other's (males) views are erroneous. This process changes the way that the situation, the other and the self are seen. Yet, in this process a person also sacrifices their sense of being able to correctly perceive the world. As such the person's (here the woman's) view is more than opposed; it is erased. Fricker fails to give us a way to understand the way power is used as described here. While preceded with contests to credibility, as Fricker's theory explains, what then arises is an untheorised interplay between testimonial and hermeneutic injustice whereby the female is no longer able to explain her view, as she has in her own mind lost her ability to accurately perceive the situation. In the current study, belief revision appeared to be gender-related, however, it is possible that in any situation where one partner has less power due to prejudice, this process may arise. Further research should explore this dynamic in situations where a partner could be considered otherwise disadvantaged. In addition, it is suggested that research should explore the manipulative partner dynamic within a sample who are known to be partner abusive.

Finally, and most importantly, the processes described in the current research suggest a social aspect to both the formation and maintenance of irrational ideas that is

not included in most theories of delusion, which focus on domain-general impairment to rationality (e.g., Freeman & Garety) even whilst suggesting that delusion involves social cognition (e.g., Blakemore, Wolpert, & Frith, 2002). Whilst suggesting that irrational thought is focussed on other people, these theories do not suggest that inherently social processes can influence the formation of false beliefs, irrational thoughts and delusions. Contrary to the majority of theory on irrational thought and delusion formation, Bell, Raihani, and Wilkinson (2019) suggest that social cognitive processes may be involved in the construction and maintenance of delusion-like beliefs. Like other beliefs that are not evidence based (e.g., religious beliefs, conspiracy theories and folie à deux) delusions may result from a dysfunction in adaptive social cognitive processes (Bortolotti, 2005) that ordinarily serve to create and maintain social affiliations and enlist social support. The exploration of social processes involved in the formation of both accurate and inaccurate understanding of other's intentions described in this chapter has used both a method suited to exploring social processes and provided evidence for three social cognitive processes: empathy, intuitive understanding of others, and strategic social influence involved in the formation and maintenance of irrational delusion-like beliefs about a partner's motivations.

However, whilst agreeing with Bell et al. (2019) that delusion-like beliefs arise from social cognitive processes related to social affiliation, the results here seem to indicate that the dysfunction appears to be located partially in the social interaction itself, not just as a dysfunctional social cognitive process located inside the person. The ability of participants to process social information appears to be intact but the strategy used by a partner to influence the other person in order to further their own needs (i.e., deferent incorporation) may create a delusion-like belief under certain circumstances.

This suggests that the need for affiliation is prioritised over autonomous needs, such as positive self-concept or rationality. The partner adopts a delusion-like belief in order to maintain the relationship at the cost of 'rationality'. It might be considered that, in some situations, the need for self-esteem and affiliation are at odds, and that the need for affiliation appears to be prioritised so that internalising a false belief is considered a better option than the potential loss of an important relationship.

This research provides preliminary evidence that false beliefs can be transmitted between partners using a social influence strategy where reasoning is strategically used to meet one partner's perceived need. It includes the following features: the need for affiliation is threatened; a fault-finding attribution-style where negative intentions or personality traits are attributed to the partner during conflict; and the unilateral use of empathy.

Clinical Implications

Traditional couple therapy relies on each individual's ability to reflect on their own thoughts and actions as well as on those of their partner. The cued recall process outlined above appears to enhance the ability of individuals to reflect on interactions with their partner as well as their own behaviour. Couples reported that they found it useful as a method of becoming aware of erroneous assumptions about their partner, their self, or the situation. Partner's responses were uniformly positive indicating the methods acceptability for use with couples. As such, it has potential clinical utility in therapeutic environments with couples. It is suggested that it could serve to enhance both reflection and the ability to integrate insights into potentially irrational interpersonal beliefs. A target for reflection might be to encourage revisions of intuitive (fast) judgments using more deliberative processes (Evans & Over, 1996).

The current research also suggests additional consideration should be given during clinical formulation to the maintenance and reinforcement potential of the dyad in safety behaviours where a partner is involved, i.e., that of partner responsibility-taking, and also deference incorporation.

In addition, it is suggested that research into the generalisability of the processes outlined above to clinical, at-risk, and forensic settings (where it is known that there is greater conviction, distress and preoccupation (Peters, Joseph, & Garety, 1999; Peters et al., 2012) needs to be conducted. The current findings suggest that practitioners should be mindful of viewing empathic understanding as an unmitigated target of all therapeutic situations, especially where one partner does not display an accommodation orientation and is lacking empathic effort. Furthermore, in situations where the partner is reporting suspicious thoughts about the other's motives, it might be reasonable in some cases to actively discourage empathic effort and flexibility. The current findings suggest accurate empathy is motivated and not an entirely automatic process and therefore that partners must expend effort in order to understand the other person. What is not clear is whether or not some relationship problems in clinical and forensic samples result from a lack of empathic effort, or why this issue may arise. This could be the subject of further research.

Although this study has confirmed the usefulness of the cued-recall process for exploring social cognition in context and how suspicious thinking influences interaction and conflict in dyads, it is necessary to reflect on the methodology used. Firstly, although the discussion is focussed on a disagreement that evolved naturally within the relationship, the discussion that takes place is within a research environment and is not a

spontaneous conflict situation. Furthermore, although each conflict theme is typical of those within normal relationships, the cued recall process itself is not completely natural as it is being recorded in the presence of a researcher; this may have implications for the content and form of the conversation that the couples chose.

Methodological Reflections.

In addition, although the findings are detailed and likely to be indicative of processes in more severe delusional and ideational states, due to methodological concerns (e.g., small sample size) any implications that can be made are tentative. Additionally, although irrational thought processes were present in this sample and findings are consistent with the notion that psychosis is on a continuum (Verdoux & van Os, 2012), the cognitive and affective processes detailed above may differ qualitatively (i.e., be different types of process from those found in at-risk, clinical or forensic populations), rather than being attenuated forms of the same processes. Therefore, it is suggested that research is conducted with populations with more severe psychotic symptoms in order to further explore these processes. Furthermore, the consistency in irrationality attributions to females when deferring to males' views may not be replicated in a larger sample so additional research is necessary using a larger sample group. Finally, the lack of experimental control of extraneous variables means that, although there is clear indication of directionality and temporality within the data for the proposed mechanistic link, this may be confounded by other factors, such as interviewer direction giving, dominance rather than gender, or relative mental health. This would suggest the need for further study of the processes suggested under experimental conditions.

CHAPTER 7. DISCUSSION CHAPTER

This thesis aimed to contribute to research by tracing one particular feature of psychotic syndromes — interpersonal suspicious thinking — to help understand jealousy, its structure and its relationship to suspicious thought. There are many variables related to this focal symptom, and this thesis takes the approach of disentangling these individual variables into antecedents, correlates and symptoms associated with this single phenomenon in jealousy and exploring the evidence for what might cause this symptom. This analysis is then used to draw conclusions about underlying mechanisms and processes related to suspicious jealousy.

Summary of Thesis Findings

Chapter 1 provided an overview of how each chapter in this thesis is organised. It also provided an overview of jealousy, and its proposed effect on behaviour. In addition, it explored what allows us to count jealousy as a different phenomenon, i.e., what, if anything, distinguishes it from other kinds of suspicious, interpersonal thought, and whether it describes a distinct phenomenon or is simply a thematic variation of a common latent, delusional thought process. Jealousy appeared only to be distinguished from other kinds of delusion by the content of the ideas held, and an individual's situational context, e.g., whether they were in a current relationship or still directing interest toward a previous partner. The following chapters developed and empirically investigated these themes starting with Chapter 2 which outlined and evaluated current jealousy theory.

Chapter 2 made a novel contribution to scientific knowledge about suspicious

jealousy by providing the first comprehensive review of the academic research related to suspicious jealousy across clinical and nonclinical populations. Several themes were identified in the empirical literature that substantiate a link to another form of suspiciousness — paranoia—in terms of shared phenomenology, antecedents and outcomes. This chapter found a substantial overlap between jealousy and other forms of suspicious interpersonal thought, in particular paranoia. It also identified gaps in the existing research, e.g., a lack of research into cognitive bias, and how jealousy comes to be irrational. The findings suggested that co-morbidity with other psychotic conditions, corresponding antecedents and related variables, and parallels between jealousy risk factors and known psychosis risk factors, link jealousy with other kinds of suspicious thought. This suggested that additional research, addressing these gaps might help to clarify the relationship between jealousy and other forms of suspiciousness.

Chapter 3 looked at theories that describe and explain how and why jealousy occurs. Focussing on how jealous people think during jealous episodes in relation to themselves, their relationship, and their partner. It explored in-depth, mechanistic links and processes suggested to generate and maintain jealousy. It outlined inconsistencies in jealousy definitions and evaluated jealousy theories. Chapter 3 suggests that many contemporary theories describe what comprises jealousy. Typically, normal jealousy has been viewed as an evolutionary process (Buss, 1988). Whereas, pathological jealousy has been viewed as a psychiatric disorder (Kingham & Gordon, 2004). As such, normal and dysfunctional jealousy have rarely been considered in the same research or model. However, explanatory theory is quite abstract and general in scope and gives less detail about how the proposed mechanistic links result in a particular jealousy outcome. This suggested that a useful development may be to seek to better understand the micro-

processes by which suspicious thoughts may arise. Furthermore, to detail which thought processes are involved, how these come to be suspicious, how they evolve over time, and how they are maintained. In addition, to attempt to understand their apparent comorbidity with other kinds of suspicious thought and delusion. Additionally, as no theory seemed to accommodate an understanding of jealousy as a cumulative structure (as might be predicted by a causal relationship with psychosis), this suggested that further theoretical development may be required to explain this relationship and provide an etiological framework for research and interventions continued evolution. This chapter found indications of a cumulative jealousy dimension related to suspicious thought, which may indicate an underlying psychotic-like trait. Further evidence was sought in the rest of this thesis, for a latent psychosis-like trait common to both.

Chapter Four explored jealousy's latent structure using multiple questionnaire data. It explored the interrelationship of its dimensions, and its relationship to paranoia. Five measurement scales were used to explore the dimensions of jealousy suggested by the theory review. Indications are that jealousy has a dimensional, cumulative structure, and that suspicious jealousy is closely related to paranoid ideation. The process indicated by the MDS 'horseshoe' (Guttman, 1957) structure suggests that pathological jealousy evolves from normal jealousy, in a sequential process related to negative affect and suspicious thought and that jealousy forms a hierarchy, whereby anxiety rather than anger produces suspicious jealous thought. Anxiety both precedes and is more proximal to suspiciousness, invasive and interrogative behaviours. Moreover, increases in anxiety intensity also relate to increases in the severity of jealous thought and behaviour. On this basis, it appears that jealousy is not a special case, and that its structure replicates that of other kinds of false belief (i.e., paranoia) and that it fits a schizotypal pattern.

Chapter 5 built on the results of Chapter 4 which indicated that jealousy has a potentially cumulative structure, whereby, anxiety is directly involved in both jealousy and paranoid thought escalation. The chapter also evaluated the psychometric properties of the included jealousy and paranoia scales. The results confirmed that jealousy has no distinct factors but forms a dimensional continuum. It also found considerable overlap between types of irrational thought (i.e., jealous, self-referential, and persecutory). These results indicate that jealousy, paranoid ideation and suspicious thoughts are scalar with persecutory rather than self-referent thinking related to more severe jealous behaviours. Therefore, paranoid ideation might usefully predict escalated, severe jealousy, and precede invasive and interrogative behaviours.

Chapter 6 reported findings from a novel application of the cued recall methodology to determine how romantic partners understand each other's intentions, and how irrational thought arises during conflict discussions. It explored: processes that influence how partners form and change (or maintain) understandings of another's intentions; how suspicious and delusion-like thoughts are approached and managed by couples; how these thoughts form and change (or not) during a couple's interactions; and how this, in turn, affects both conflict processes and the couple's relationship. There were three main findings. Firstly, that empathy processes appear to be connected to accuracy when understanding the partner's intentions. Secondly, that irrational ideas seemed to form when a partner's intentions were judged using unchecked intuitive cues, or their own current negative affect. Thirdly, partners appeared not to revise erroneous beliefs about their partner when unchecked intuition is used to form a judgement. Although a small sample was used for the study, the findings suggest that erroneous beliefs during partner conflict are very common, occurring for every couple in the study.

Interestingly, partner's thoughts and beliefs were substantially altered during the conflict process, therefore social-cognitive and affiliative processes may play a significant role in delusion formation and maintenance. Furthermore, in certain situations, this process may form a mechanism, *deferent incorporation*, by which coercion could be enacted. These results have implications for the clinical support of couples and for forensic examination by partner abuse researchers.

The next section of this final chapter draws together the ideas presented in the thesis and presents an initial outline of an integrated model of jealousy that is informed by the current findings.

Model of Jealousy

A detailed overview of current models of jealousy suggested that no one model comprehensively accounts for the accumulated evidence discussed in Chapter 2. The review in Chapter 3 indicated that, although many theories describe suspicious thinking as a feature of jealousy, to our knowledge, there was no existing theory of jealousy that explained why or how more pathological forms of jealousy are accompanied by more suspicious thinking. The following paragraphs will: begin to outline a model that integrates theory from Chapter 3 that fits the empirical findings; introduce theory from other areas of research that might explain how the processes found in Chapters 3–6 relate to jealousy escalation; and give further detail about how these cognitive and affective processes might evolve over time. Specifically, it will suggest how affect and cognition may act as motivators, to result or not in hostile, aggressive and controlling behaviours toward a romantic partner. Additionally, the model describes processes that maintain suspicious jealousy.

Previous attempts to measure and conceptualise the structure of jealousy have used factor analytic techniques, an approach which is useful, but has a number of flaws, i.e., that it proceeds by classifying only those items that were put into the analysis, without first defining the full range of items that should be included. This limitation is important because factor analysis reproduces structures based only on the items included. Therefore, it inadvertently reproduces the researcher's (implicit) theoretical model from which they derive the items. Facet theory (Guttman, 1971), on which MDS analytic techniques are based, is a potential remedy to problems where, like jealousy, diverse conceptualisations have been a major difficulty. This approach has proven useful in the development of comprehensive theory in other areas of psychology, e.g., in organisational development (White & Mitchell, 1976). Furthermore, it has been used to define and develop theory about other subclinical psychotic processes (Kidd, Hammond, & Bishopp, 1998). This approach therefore might be usefully applied to jealousy. Facet theory is both a systematic procedure for defining concepts, objects and events into a multi-property classification system and a way of exploring and understanding that concepts structure (Canter, 1985). Therefore, by defining an exhaustive range of relevant properties, prior to structural analysis, it ensures that the whole domain is exhaustively mapped, rather than reproducing the researcher's particular theoretical stance (McGrath, 1967).

The facet approach iterates between theory and data (Canter, 1985). The findings reported here suggests that the facets: anxiety, increased suspiciousness, and psychosis, identified in Chapters 2 and 3, might require further explanation, as does their link to jealousy. Furthermore, the dimensions — *normal jealousy, unease, annoyance/possessiveness, anxious/suspiciousness, inquisitiveness* and *invasiveness*.

The relationship of these dimensions to anger and anxious affect, and the apparent escalation of interpersonal suspicious thinking identified in Chapters 4 and 5, require additional theoretical integration.

A useful starting point for theory development is to have a clear description of the phenomena and each characteristic or process that you hope to explain (Ward & Seigert, 2002). The model outlined here will explain jealousy processes in romantic relationships, not in children or between siblings and across community, clinical and forensic populations. It will explain the distinctions between jealousy that results in either benign or positive relationship outcomes, or alternatively, aggression or control of a partner. Furthermore, a model is sought that can explain the differing severity and frequency of behaviours that result from jealousy across adult populations. Therefore, a multifactorial explanation is outlined that combines both static and dynamic factors. In addition, it provides detail about the proposed mechanistic link (e.g., between jealousy and anxiety or mental ill-health) which explains how each jealousy symptom/phenomenon arises and how each mechanism interacts to result in the different phenomena proposed to be generated by jealousy.

The following section summarises the results of Chapters 2 and 3. Then presents an account of prior research and contemporary jealousy theory that integrates the escalation process demonstrated in Chapters 4 and 5, by drawing upon theory from a related area of research.

Overview of the Proposed Theoretical Model

In this section, a jealousy model is proposed and summarised in schematic form (Figures 13–16). This model will map how jealousy arises, is maintained, and results in

the suggested outcome behaviours. In addition, it will clarify psychological mechanisms that result in normal jealousy and suspicious forms of jealousy. The model integrates cumulative dimensions of jealousy, explains how risk factors that have good evidence for a causal link with jealousy (outlined in Chapter 2 and summarised in Figure 13) result in jealousy and interact with each other, and explains how jealous thinking is maintained—so that sufferers cannot easily dismiss thoughts. The details of the model’s aims are presented below in Table 34.

Table 34. Outline of theoretical development commitments.

(Based on the gaps identified in the literature and theory reviews, Chapters 2 & 3).

-
1. Integrate Bringle's (1991) ideas that certain aspects of a person's socio-cultural background influence the frequency and severity of jealousy. Furthermore, that it is the focus on endogenous or exogenous factors that determines the type of jealousy experienced and enacted. Also, that commitment, insecurity and arousability influence jealousy.
 2. Include all potentially causal risk factors that current research suggests are associated with jealousy into a single, comprehensive model.
 3. Integrate empirically substantiated developmental risk factors into the model.
 4. Create a model of jealousy that is testable empirically, with clearly detailed processes.
 5. Integrate explanations for the relationship of jealousy to psychosis.
 6. Explain how affect and cognition, specifically anxiety and irrational thinking interact.
 7. Detail specific, testable cognitive mechanisms that may be involved in onset and maintenance of suspicious forms of jealousy.
 8. Incorporate elements from models of positive symptoms. of psychosis (Garety, Kuipers, Fowler, Freeman, & Bebbington., 2001) and persecutory delusions (Freeman et al., 2002) which better detail the interaction between anxiety and suspicious thinking (paranoid ideation) than previous models of jealousy.
-

Currently it is not clear how suspicious jealousy arises, is maintained, and results in the hypothesised outcome behaviours. Theory and research suggest that four problems or symptom clusters are associated with jealousy: cognitive distortions, emotional regulation problems, hostility toward the partner or rival, and attempts to control the partner (summarised in Chapters 2 & 3). However, despite most people sometimes experiencing jealousy (White, 1989), most people neither express jealousy in dysfunctional ways, nor have the problems of dysfunction described above and are more likely to attempt functional strategies to maintain the relationship, e.g., discussing their

fears, increasing their attractiveness or increasing the relationship rewards to the partner. Theories of jealousy attempt to explain why this is the case and how the types or dimensions of jealousy, and the behavioural outcomes differ. The theories integrated in the proposed model have been selected to be consistent with the accumulated evidence (described in Chapter 2), and according to the logic of their explanation and the strength of ideas (Kalmar & Sternberg, 1988) and are mapped below in Figures 13 –16.

The findings from Chapter 3, details the factors that relate to prior theory. These are summarised in Figure 13. Evidence suggests that jealousy responses are composed of both person and situational aspects and that both constitute main effects (Argyle & Little, 1976; Bringle, Renner, Terry, & Davis, 1983). Furthermore, a number of factors (denoted by asterisks) found in the review of research were not well accounted for by current jealousy theories. The following section details the relationship between jealousy and paranoid ideation further and gives detail of how a model of a parallel process might help to explain the process by which anxiety leads to jealousy escalation.

| HISTORICAL FACTORS | DYNAMIC/ PERSONALITY FACTORS | CONTEXTUAL FACTORS | CLINICAL FACTORS |
|--|--|--|--|
| <ul style="list-style-type: none"> - Trauma (Studies 6 & 7) * - Attachment security (Dutton, 1996; Hart, 2016) - Socialisation & cultural inheritance (Hupka, 1991) - Evolutionary advantage (Buss et al., 1992) | <ul style="list-style-type: none"> - Rigidity (Studies 1, 9 & 10) * - Low self-esteem (Studies 10, 12, 16 & 22) - Hostility (Studies 1 & 6) * | <ul style="list-style-type: none"> - Relationship threat (Bringle, 1991; Knobloch & Solomon, 1998) - Perceived relationship inequity (Study 22) - Being in a current partner relationship or having a focus on a previous partner (Study 3) | <ul style="list-style-type: none"> - Current level of anxiety/neurosis (Studies 1,2,5,8,10, & 13) * - Lack of insight into belief distortions (Study 9) * - Anomalous experience/unlabelled anxiety (The current model) * - Dysfunctional schemas & cognitions* (Study 21) * - General mental ill-health (Study 12) * - Borderline Personality Organisation (Dutton, 1994; Studies 6 & 7) * - Ruminative thought (Study 2) * - Social skills deficits (Study 6) * - PTSD (Studies 6 & 7) * - Psychosis (Marazitti et al., 2010; Chapters 3, 4, 5 this thesis.) * |

Figure 13. Summary of factors which have good research evidence that suggests they contribute to jealousy.

N.B. References to the evidence are provided for each factor. Where study numbers are given these refer to studies in Chapter 2 of this thesis.

The Formation of Paranoid Beliefs

Chapters 4 and 5 demonstrated a clear relationship between interpersonal suspiciousness in jealousy and self-referent and persecutory ideation. Ideas of interpersonal threat in jealousy might therefore have much in common with other ideas about threat-beliefs. The current model focusses on this symptom — interpersonal suspiciousness — which is related to beliefs about interpersonal threat. Two models (Freeman et al., 2002; Garety et al., 2001) describe the threat-belief process well and have had good heuristic value; having proven fertile for both researchers and clinicians, by producing confirmatory research evidence and improvements to paranoia interventions. The phenomena described by both models share many common features with suspicious jealousy and, as outlined above, they share a focus on threat-beliefs, despite differing content. Furthermore, as Chapter 2 indicated, much like other kinds of threat belief (Freeman et al., 2002), suspicious jealousy is strongly related to distress and anxiety (see Chapter 2). Therefore, the current model applies models of positive symptom (Garety et al., 2001) and persecutory ideation (Freeman et al., 2002) onset, escalation and maintenance process to jealous ideation.

Symptom emergence in other kinds of ideation arises due to the interaction between prior vulnerability (from biological, social, genetic and psychological factors) and stress (which can also be biological, social or psychological) (Freeman et al., 2002). Freeman et al.'s (2002) model suggests that: delusion formation is precipitated by a stressful life-event or intoxication, and delusion proneness arises due to prior vulnerabilities, in what is termed *stress-vulnerability*; it results from two primary mechanisms, an externalising attribution bias (similar to that found in couples' erroneous attribution of intentions in Chapter 5) and the individual's emotional state;

and that delusions are a direct reflection of the individual's emotional state and are therefore consistent with existing ideas about the self, others and the world. This section outlined the relationships between paranoia and jealousy and how these relate to contemporary jealousy theory. The following section will outline in more detail how paranoid beliefs form, establish the similarities of these beliefs with jealous ideation, and relate these ideas to the outlined model.

Paranoia is a way of dealing with threats to the self in social situations (Trower & Chadwick, 1995), which affects interpersonal relationships. Paranoid people make abnormal attributions about social situations due to misinterpreting the motives of others in social situations (Hewstone & Jaspars, 1987). They also have inflexible beliefs (i.e., a strong level of certainty about these attributions) which are resistant to change (Freeman, 2007). People with paranoia seem to misattribute emotional experiences and feelings to external situations (Grèzes, Frith, & Passingham, 2004) and have difficulty in weighing the evidence when making decisions (Hemsley & Garety, 1986). Research reviews suggest that psychotic illness tends to be cyclical or episodic (Harrison et al., 2001), and therefore cognitive deficits may only be present during an acute phase of the illness.

2.1 Emotions, delusion and distress. The empirical literature reviewed in Chapter 2 suggested that jealousy is associated with distress and anxiety. The proposal that emotional distress is related to delusion or ideation mirrors ideas about persecutory thinking. However, these ideas suggest that distress and anxiety arise from and are directly related to both delusional content, and the sufferer's appraisal of a delusion and its associated experiences (Freeman et al., 2002).

Like jealousy, paranoia comprises both cognitive and affective elements (Freeman & Garety, 2004). Freeman and Garety's (2004) threat anticipation model, presented in Figure 14, suggests multiple factors are responsible for the formation of delusional beliefs and ideation (i.e., cognitive biases, the misattribution of arousal and anomalous experiences and heightened affect), with persistence being strongly tied to reasoning processes (Figure 15). They conceptualise delusions as strongly held but misattributed beliefs that are the person's attempts to make sense of internal experiences, such as alcohol or illicit drug intoxication (Frith, 1992; Hemsley, 1994). Like paranoia (Freeman, 2007) Bringle's (1991) cognitive model of jealousy suggests that pathological jealousy experiences include heightened affect, and misinterpretation of ambiguous social information. Figure 14 summarises Freeman and Garety's (2004) threat anticipation model describes delusion formation; showing paranoia's relationship to psychotic reasoning biases, affect regulation difficulties, and negative self-esteem.

2.2. How cognition and affect interact to form and maintain false beliefs.

Freeman and Garety's (2004) conceptualisation might be used to extend Bringle's (1991), ideas that heightened affect, ambiguous information, and contextual factors are important to jealousy escalation (see Chapter 3), to map a process which could result in the onset and escalation of irrational thinking. Freeman and Garety (2004) postulate that persecutory thinking contains threat beliefs about social, psychological or physical harm, which occur in the context of emotional distress, often directly after stressful events (e.g., bullying, or interpersonal conflict), and are strongly linked to low (negative) self-esteem (for a review see Freeman, 2007). They suggest that those vulnerable to suspicious thoughts externalise emotion related to stressful events, drawing on negative or ambiguous information as evidence in trying to make sense of

unusual internal experience, e.g., when anxious they may infer from others' facial expressions or loud voices that other people are behaving in ways to deliberately antagonise or harm them.

According to the model, illustrated in Figure 14, persecutory ideas are most likely to occur when: there are reasoning biases (especially a '*jumping to conclusions*' bias in data gathering, a likelihood of using a small amount of information to make a firm decision); a failure to consider alternative explanations (Freeman et al., 2004); disconfirmatory evidence is not sought, i.e., there is confirmation bias (Allen et al., 2005) and/or negative interpretation biases (Savulich et al., 2015).



Figure 14. Summary of the formation of a persecutory delusion (Freeman & Garety, 2004)

What Might an Understanding of the Processes Related to the Formation of a Persecutory Delusion add to our Understanding of Irrational Jealousy?

Reports from clinicians and research (e.g., Musalek et al., 1989) suggest that the

paranoid content themes vary in each individual. However, both delusional and ideational thought appear to follow a similar onset and maintenance process (in that others are seen as persecutors, the person has little control over the situation, and they deserve harm). Both Bringle (1991) and Freeman and Garety (2004) suggest that suspicious thinking is due to drawing erroneous conclusions from ambiguous social, and in the case of Freeman and Garety, affective information. Whilst Bringle (1991) alludes to the importance of cognitive distortions and biases in illusory belief formation, Freeman and Garety (2004) suggest this relationship is directly causal. Construing this relationship as causal might help to better explore and explain: (a) jealousy processes, (b) how affective, cognitive, and situational variables interact, and (c) how irrational jealousy arises and persists. Paranoid beliefs are said to result from internal experiences (e.g., anxiety or emotions that the person is not aware of) which are misattributed to external events (Freeman & Garety, 2004). Adopting this approach adds further detail regarding how these features may interact and elaborates upon the processes by which irrational jealous thoughts might arise and be maintained.

Cognitive bias which Bringle (1991) suggested may be important in jealousy formation and escalation, has proven important to the development and maintenance of persecutory thought (Freeman et al., 2002). Freeman and Garety provide suggestions about how these are involved in belief maintenance. Figure 15 illustrates that belief maintenance process. Applied to jealousy this would suggest that, like paranoid individuals (Freeman et al., 2004), jealous individuals will jump-to-conclusions and look for evidence consistent with their belief (Maher, 1988). This proposal is consistent with the findings in Chapter 5. The advantage of extrapolating Freeman et al.'s (2002) model to jealousy maintenance is that it suggests both the role of bias in belief

maintenance and specific biases involved in this process. They suggest that disconfirmatory evidence is discarded in two main ways: by the use of safety behaviours, which also maintain negative emotional states (see Clark, 1999), and by incorporating the failure of predicted harm events to the deviousness of their persecutors, i.e., to their lying or otherwise concealing their true actions. Thus, it provides an explanation as to why beliefs might persist when the predicted harm has not occurred. In summary, cognitive biases, affective processes, poor emotional regulation, and low self-esteem are persistently linked to paranoid ideation (see Chapter 2). What appear to be safety behaviours, which may maintain suspicious beliefs, were also evident in the dialogues of participants in Chapter 5. Furthermore, it appears this type of thinking may also play a role irrational idea maintenance in couple dialogues.

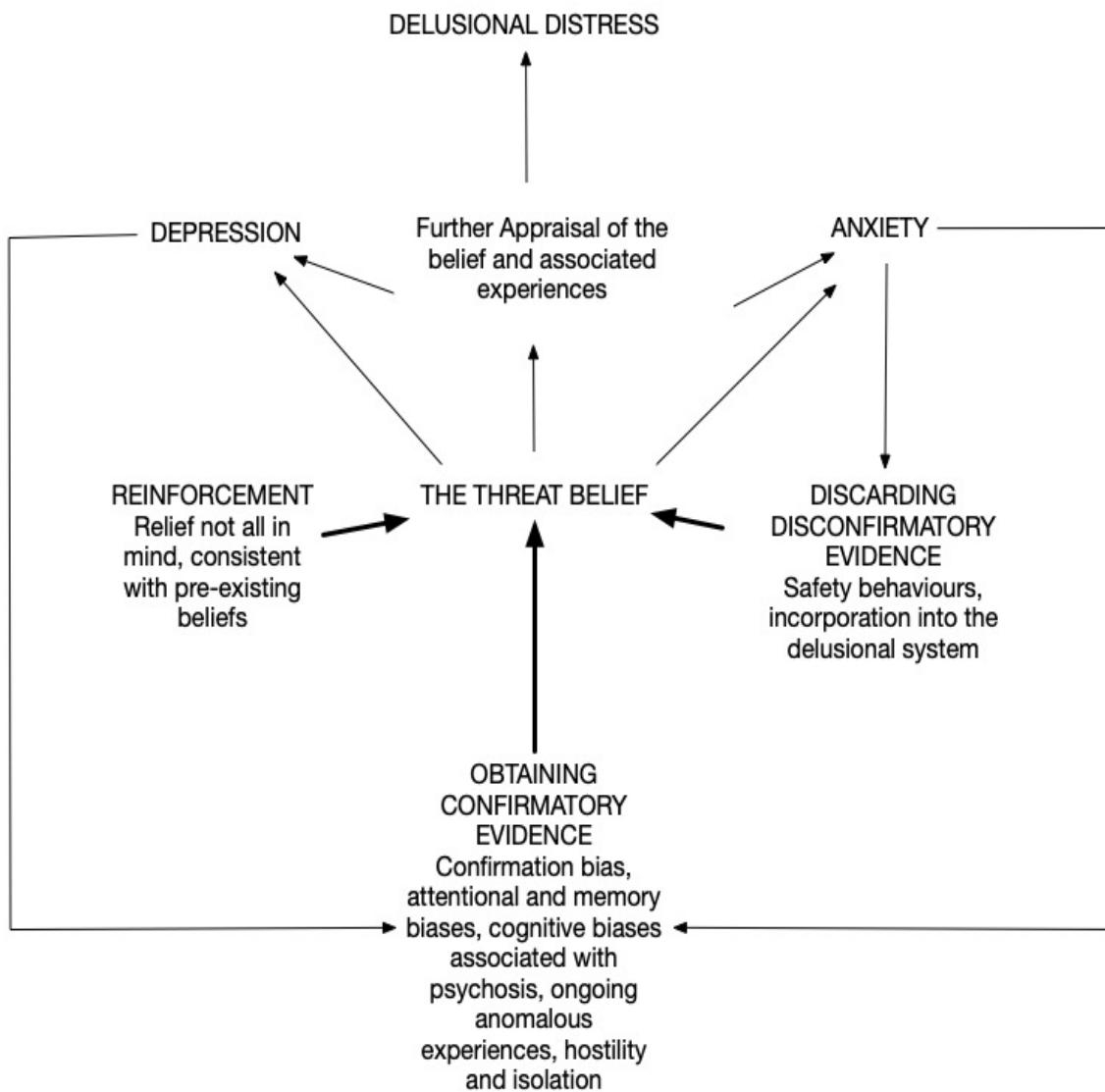


Figure 15. Maintenance of a threat belief (Freeman et al., 2002).

Relationship to Other Theories of Jealousy

Chapter 3 suggested that evolutionary biology (Buss, 1988) provides an effective explanation for normal jealousy's function. Bringle's (1991) theory incorporates multiple levels of explanation and both distal and proximal factors to link predisposing factors with differentiated aetiologies for differing types of jealousy and specifies how particular patterns of thought lead differing types of jealousy. Mathes and Severa's (1981) model addresses how different types of relationship threat might result

in different levels of jealous pathology. This model has been integrated in this chapter with other developmental and cognitive explanations. However, the model still does not provide a concrete process by which these precursors evolve. This suggests that adopting ideas from research related to false-beliefs, into the current jealousy theory, might add to our understanding of the mechanism detailed for other forms of psychosis escalation (e.g., jumping-to-conclusions bias and thought inflexibility) (Freeman, 2007).

Cognitive bias and emotional distress are central to delusional and ideational processes (Freeman et al., 2004) and are the main mechanisms which result in the onset and maintenance of delusional or ideational beliefs. The new model proposes, on the basis of evidence provided in Chapters 3–5 which outlines the close relationship between suspicious jealousy, paranoia and anxiety, that current anxiety may trigger a psychosis-like state. Further to this, it suggests that jealousy levels will be determined by the intensity of current anxiety. These state variables thus provide the mechanism that initiates and maintains jealous ideation.

Processes involved in the onset, escalation and maintenance of suspicious jealousy are given further detail by drawing on a cognitive model of the positive symptoms of psychosis (Garety et al., 2001). The approach of applying this model to other kinds of delusional thought has a precedent, having been previously applied to persecutory ideation (Freeman et al., 2002). As is the case with other positive symptoms of psychosis (Garety et al., 2001) and persecutory ideation (Freeman et al., 2002), it is hypothesised that in jealous ideation, both anxiety and suspiciousness have a reciprocal relationship where increased anxiety leads to increased levels of irrational thinking.

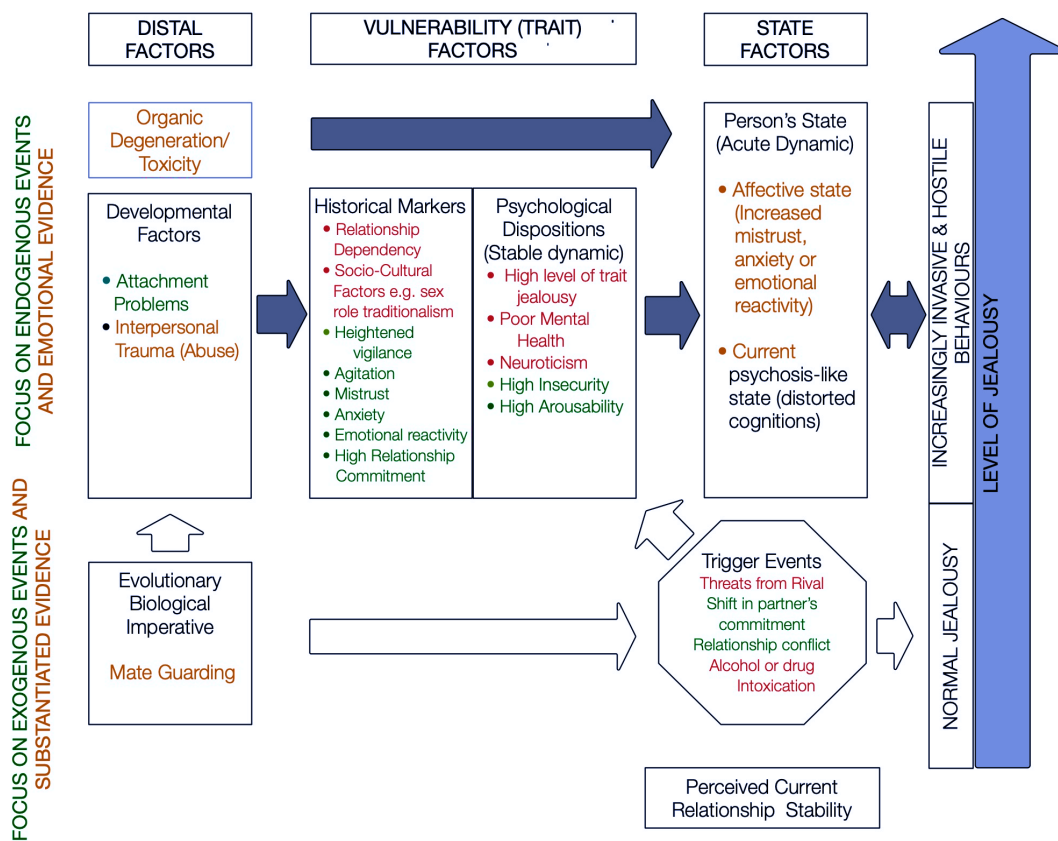


Figure 16. Integrated model of jealousy.

N.B. red text refers to concepts from Mathes' theory, green text to concepts from Bringle's theory, amber text relates to novel ideas (details in the text). The arrows present major links

Figure 16 shows three distinct pathways to jealousy. Each pathway in the model results from different mechanisms and follows a distinct process. The first is shown towards the bottom of Figure 16 and results in normal (mate-guarding) jealousy, which evolves from a biological imperative (Buss, 1988), and which leads to jealousy when combined with triggering events, e.g., an argument with a romantic partner. This jealousy is focussed on exogenous factors. The second pathway leads to varying levels of jealous pathology via general increases in psychosis-like ideation/suspiciousness, which are likely due to prior historical and psychological vulnerabilities (detailed in Figure 13). This type of jealousy has a focus on endogenous factors. The model speculates that one endogenous factor that contributes to escalation may be an

individual's lack of awareness of anxiety that they experience but do not recognise and thus which they erroneously attribute to external events (i.e., it is externalised as a feature of the relationship). These prior vulnerabilities in the presence of a triggering event are proposed as a likely cause of increased jealous suspiciousness. The final pathway is pathological and arises due to organic degeneration, e.g., drugs for Parkinsonism or alcoholic decline.

Evaluation of this Model

The theory knitting approach (Kalmar & Sternberg, 1988) suggests that to further understanding of any phenomenon, the consistent explanations between theories, the strongest ideas (on the basis of data and logic) from multiple theories, and the researchers' own ideas about a phenomenon, should be integrated in a way that best explains accumulated knowledge about that phenomenon. It should focus on explaining how it arises and how it works (mechanisms) over time (processes). Mechanisms are links between a psychological process or process and its' outcomes or effects. They are what makes things work, either in a functional or, where the mechanism doesn't work as it was intended, in a dysfunctional manner (Ward & Seigert, 2008). Examples of dysfunctional mechanisms are excessive clinging to a partner or irrational beliefs about their fidelity. Bradford-Hill's (1973), criteria which were outlined in the introduction to this thesis are generally accepted to be indicators with which to evaluate causality. The main principles embodied are that a theory or explanation should explain the body of empirical data, that cause should precede effect, that experimental data should carry a stronger weight, and that theory be sufficiently comprehensive in scope and explanatory depth, yet be simple, prudent, consistent, and coherent. Table 35 details how and where in this thesis and chapter the commitments made in Table 34 are addressed.

Whilst the current model is speculative, it explains the factors highlighted in the systematic review as important in suspicious jealousy. By proposing that jealousy is a dimensional continuum, both anxiety and psychosis-like symptoms can be tested as indicators of escalation.

It is hoped that by incorporating biological (organic deterioration, detailed in Chapter 2) and evolutionary imperatives (outlined by Buss, 1988) and giving greater detail to the potential role of anxiety that Chapter 2's findings suggest has a central role in suspicious jealousy; and by incorporating established ideas about the relationship between anxiety and positive psychosis symptoms (Garety et al., 2001) and other forms of suspicious ideation (Freeman et al., 2002) to make a novel contribution to knowledge about jealousy.

Furthermore, it is hoped that the work here may better explain the established relationship between anxiety, jealousy and partner aggressive (intrusive) behaviours (Priolo-Filho, Padovani, & Williams, 2019; Wigman, Graham-Kevan, & Archer, 2008), and specifically why paranoia and jealousy might frequently co-occur in partner aggression perpetrators (Capaldi et al., 2012; Stith et al., 2004). Additionally, it is hoped that the proposed reciprocal role of anxiety and psychotic-like symptoms may model the boundary between normal jealousy and jealous pathology.

Table 35. How the integrated model and this thesis maps to the commitments made in Table 33 of this chapter and incorporates the evaluative principles outlined.

| Commitment | Where in this thesis? |
|--|-----------------------|
| 1. Explain jealousy processes in romantic relationship, not in children/siblings and across community clinical and forensic populations. | Chapters 2, 3 & 7 |
| 2. Distinguish between jealous outcomes. | Chapters 4, 5 & 7 |

| Commitment | Where in this thesis? |
|---|---|
| 3. Explain severity and frequency of behaviours across adult populations. | Chapters 2, 4, 5 & 7 |
| 4. Incorporate empirically established static and dynamic; distal and proximal risk (psychological, biological, cultural and situational) factors into a single model | Chapters 2 & 7: (Chapter 7, Figures 13 & 16) |
| 5. Detail distinct mechanisms to explain how each jealousy symptom arises (esp. interpersonal suspicion) and how these interact to result in the varied outcomes. | Chapters 2 & 4–7 |
| 6. Integrate aspects of socio-cultural background (Bringle, 1991) and explain how these result in different jealousy frequency, severity or outcome. | Chapters 3 & 7 |
| 7. Incorporate notion of endogenous/exogenous focus determining jealousy severity (Bringle, 1991) (Chapter 7) and explain the interpersonal suspicion dynamic functions within couple relationships (Chapter 6). | Chapter 6 & 7 |
| 8. Create an empirically testable model, with detailed processes. | Chapter 7 |
| 9. Integrate explanation for the relationship between jealousy and psychosis. | Chapter 4–7 |
| 10. Explain interactions between affect and cognition, specifically anxiety and irrational thinking. | Chapter 7 |
| 11. Detail specific, testable cognitive mechanisms involved in jealous suspicion onset and maintenance. | Chapter 7 |
| 12. Incorporate elements from related theory (positive symptoms/persecutory ideation models) to better explain the empirically observed relationship between anxiety and interpersonal suspicious thought (including jealousy). | Chapters 2– 7, (Chapter 7, Figure 16) |

Theoretical Implications

Overall, the findings of this thesis suggest that suspicious interpersonal thoughts may be useful as a tracer symptom for an underlying psychosis-like experience that appears to accompany escalating jealousy. The novel contribution of this thesis is a model which proposes that suspicious (pathological) jealousy results from a general escalation of suspicious/psychosis-like thinking, as a result of escalating anxiety, in the presence of externalising biases and relationship triggers, and that it is not a special case. The suggested model provides a new direction for research and further theory development.

Practical and Clinical Implications

The model and the findings of this thesis may provide improved indicators for risk assessment. It appears that increases in suspicious thought, rather than anger towards a partner, is related to the likelihood of coercive or intrusive behaviours. These findings suggest that anxiety management should be the target for clinical and forensic management. As is the case for persecutory delusions (Freeman et al., 2002), conceptualising jealous ideation as a threat belief leads to the objective of therapy being reduction of emotional distress via change in the degree of conviction in the threat beliefs, which might be achieved by co-constructing with the sufferer an alternative explanations for the belief. Furthermore, as Freeman et al. (2002) suggest, developing individualised models which identify and then aim to reduce the identified maintenance factors (e.g., specific safety behaviours, reasoning and attentional biases) would seem to be likely to lead to productive outcomes.

Furthermore, in relation to the measurement of jealousy. The results reported in

this thesis suggest that current jealousy scales would benefit from revision in order to provide both effective scalar measurement and also to include items related to facets that were missing in the current scales (e.g., behaviours associated with normal jealousy). Furthermore, additional scale development should include the establishment of both subclinical and clinical cut-offs using the onset and intensity of particular ideational states, and test these using relevant outcome variables.

Limitations

The following paragraphs will outline limitations, open questions and suggest future research directions.

One limitation of the research in this thesis is that the sample used for the analysis was, for the type of analysis, a relatively small student sample. Student samples have frequently been criticised as unrepresentative. Whilst this may previously have been the case, 49% of the U.K. population now undertake undergraduate study (HEIPR; Department of Education, 2019). This means that critiques directed towards sampling issues in the past, when only small percentage of the population undertook undergraduate studies [e.g., in 1989 only 13.7% of the population studied at degree level, (Department of Education, 1989)] may now be less meaningful. A further limitation of the sample in Chapters 4 and 5, was its gender-bias due to the recruitment method, as social science students are predominantly female. Whilst this thesis attempted to address this (i.e., using methods that create population invariant solutions, and using an adequate sample size), the model estimations may be only applicable to this and similar samples. A further limitation was the scope of the jealousy instruments used in Chapters 4 and 5, as this may have presented a narrow theoretical view of

jealousy. However, through comprehensively reviewing the jealousy literature and theory, it was hoped that the ‘*universe*’ (Guttman, 1944) of jealousy was adequately mapped.

One further limitation is that by focussing on interpersonal suspicious thought, although many other features of jealousy were included within this focus, other processes that contribute to jealousy may have been ignored. What is positive about the research in this thesis, is that the process employed to explore the specifics of this single symptom, may be used to explore other symptoms, and to enable comparison of the process outlined here and other processes which have not yet been subject to this kind of analysis.

Future directions

The research and model in this thesis suggest a number of potential avenues for research detailed in Table 36, Part 1.

That jealous thought and nervous affect follow similar patterns to those found in paranoid ideation (Freeman et al., 2002), suggests that similar to that conducted for persecutory ideation using experimental designs in virtual environments (Fornells-Ambrojo et al., 2015) could be used to test if this assumption holds for jealous ideation and whether levels of jealous ideation can be influenced by provoking anxiety. Furthermore, the relationship established here between different forms of interpersonal, suspicious thought, is indicative of a latent psychotic-like trait. Therefore, problematic jealousy in the general population might be a positive symptom of underlying subclinical, psychosis-like trait.

Psychosis is known to alter cognition (Bentall et al., 2009), and has an

established link to prior trauma (Morrison, Frame, & Larkin, 2003). One practical implication of a latent psychosis-like trait underlying jealousy is that it may offer a potential mechanism with which to explain comorbidity between jealousy and partner abuse (Capaldi et al., 2002; Stith et al., 2004). The intergenerational continuation hypothesis of domestic abuse (Widom, 1989) suggests that childhood abuse victimisation begets adult abusiveness. Findings here suggest that this process may be mediated by subclinical psychosis. Therefore, further research should determine if the increased risk of partner violence perpetration in people who have suffered prior childhood abuse/trauma (Dutton, 1994; Dutton et al., 1996) might be explained by the presence of clinical or subclinical levels of psychosis in perpetrators. This would require, preferably longitudinal research on large samples to be conducted in order to ascertain if trauma, subclinical or clinical levels of PTSD are related to jealousy in normal and clinical populations. In addition, determining if trauma events are related to jealous ideation, specific mechanisms or symptoms within the PTSD symptom pattern should be explored in order to see if they might provide corroboration for the cognitive or affective mechanisms outlined here.

A number of questions that were highlighted in Chapter 2 have not been addressed by this thesis. These are shown in Part 2 of Table 36. These questions require appropriate research designs and should be the subject of future research

Table 36. Directions for future research.

Part 1

1. Experimental evidence should be collected to further understand the cumulative structure/escalation process indicated in Chapters 4 & 5.
2. The relationship found here between paranoia and jealousy should be the subject of future investigations that explore romantic jealousy as a form of psychosis and that subsequently test if the same production and maintenance conditions as those suggested for other persecutory ideas (e.g., safety behaviours) and in Chapter 6, are found. This exploration would be possible using techniques that have previously used for paranoid ideation, such as virtual reality.
3. Further tests should be made between more severe jealousy behaviours and persecutory ideation, that include measures of state ideation to determine if fluctuation in jealousy influences severity.
4. As the current research suggests that psychosis-like ideational symptoms will predict IPV perpetration. Further exploration is needed regarding the relationship between psychosis-like beliefs, emotion and jealous behaviours. This research pathway should seek to isolate whether suspicious jealousy is based in childhood attachment difficulties (e.g., Dutton, 1999) or whether it is more likely, as outlined here, a form of subclinical psychosis where the likely aetiology results from trauma experience (Garety & Freeman, 2001)

Part 2. Further research should also explore:

5. How do jealous people with reasonable evidence for their suspicions and those who are irrationally suspicious evaluate evidence, particularly in ambiguous social situations?
 6. The role of cognitive rigidity in jealous ideation, what accounts for variability in levels of rigidity, and how do suspicions become rigid?
 7. Are fluctuations in anxiety levels related to the irrationality and intensity of jealous suspicions?
 8. Can it be shown experimentally that the psychological factors outlined here are causal in jealous, suspicious thinking?
 9. Which factors distinguish between those who are irrationally suspicious and those whose partner suspicions are evidence-based?
 10. Do fluctuations in the levels of psychosis and other variables related to it (such as sleep pattern and neurosis) lead to concurrent fluctuations in irrational jealousy?
-

The previous paragraphs summarised the limitations of this thesis and avenues for future research. The following paragraph provides a summary of this chapter and highlights the main contributions of this thesis.

Conclusions

This chapter has summarised the findings of previous chapters and reported an integrated model of jealousy. This model builds on previous jealousy models by better explaining prior empirical findings and offers a new process that is consistent with that body of research and the current findings. This model may give crucial insights into how jealousy and perceived distortions of other's intentions may arise, escalate and deescalate. Furthermore, it suggests a promising approach to the problems of disentangling the boundaries between what constitutes normal and clinically significant jealousy and suggests future developments for both research into problematic jealousy and potential avenues for clinical and forensic intervention and management.

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N.B. Entries marked with an asterisk* are those included in the systematic review.

APPENDICES

APPENDIX A. Inclusion and Exclusion Criteria for Systematic Review

Articles were inspected for the following criteria: they were empirical; available in English; peer-reviewed; referred to human participants; were from community, clinical and forensic samples; included mental or psychological processes; referred to cognitive or affective mechanisms; addressed irrational or excessive jealousy and suspicious thinking, delusion, ideation or paranoia; referred to antecedents, causes, processes or mechanisms; or reported a relationship to other variables likely to cause impaired functioning in a person or romantic relationship; involved a community sample, or a forensic sample, or a clinical sample where delusion was present but was not the subject of a single case study, as these were thought to be weak designs that involved rare cases. Also, cognitive dysfunction or bias needed to be adequately described to provide adequate definition and operationalisation of suspicious cognition. In line with other symptom-specific research (e.g. Cloninger, 2002; Demjaha et al., 2009) a definition of irrational jealousy was used that included schizophrenic, drug or alcohol dependent participants and those with other psychiatric diagnoses even though these are excluded from DSM III & IV jealousy classifications. Studies were excluded if they were psychoanalytic, evolutionary biological, reporting drug trials, referred to envy, did not refer to cognition, failed to report complete data on sample or operationalisation of variables, or involved data from participants where jealousy was substantiated by evidence of infidelity. The ideal studies for examining the association of jealousy to other kinds of suspicious delusional or ideational cognition would have used experimental or longitudinal designs. However, cross-sectional designs were included as experimental or longitudinal studies were rare. This review is not concerned with situational, psychobiological, environmental and partner variables that contribute to the situation except where they influence cognition, as other authors have dealt these with adequately (e.g. Buss, Larsen, Westen, & Semmelroth, 1992; White, 1981; and they are the subject of analysis in Chapter 3

Appendix G Quality appraisal checklist – quantitative studies reporting correlations and associations (pages 200-205)

A correlates review (see section 3.3.4) attempts to establish the factors that are associated or correlated with positive or negative health behaviours or outcomes. Evidence for correlate reviews will come both from specifically designed correlation studies and other study designs that also report on correlations. This checklist^[15] has been developed for assessing the validity of studies reporting correlations. It is based on the appraisal step of the 'Graphical appraisal tool for epidemiological studies (GATE)', developed by Jackson et al. (2006).

This checklist enables a reviewer to appraise a study's internal and external validity after addressing the following key aspects of study design: characteristics of study participants; definition of independent variables; outcomes assessed and methods of analyses.

Like GATE, this checklist is intended to be used in an electronic (Excel) format that will facilitate both the sharing and storage of data, and through linkage with other documents, the compilation of research reports. Much of the guidance to support the completion of the critical appraisal form that is reproduced below also appears in 'pop-up' windows in the electronic version^[16]. There are 5 sections of the revised GATE. Section 1 seeks to assess the key population criteria for determining the study's external validity – that is, the extent to which the findings of a study are generalisable beyond the confines of the study to the study's source population. Sections 2 to 4 assess the key criteria for determining the study's internal validity – that is, making sure that the study has been carried out carefully, and that the identified associations are valid and are not due to some other (often unidentified) factor.

Checklist items are worded so that 1 of 5 responses is possible:

++ Indicates that for that particular aspect of study design, the study has been designed or conducted in such a way as to minimise the risk of bias.

+ Indicates that either the answer to the checklist question is not clear from the way the study is reported, or that the study may not have addressed all potential sources of bias for that particular aspect of study design.

– Should be reserved for those aspects of the study design in which significant sources of bias may persist.

Not reported

(NR) Should be reserved for those aspects in which the study under review fails to report how they have (or might have) been considered.

Not applicable

(NA) Should be reserved for those study design aspects that are not applicable given the study design under review (for example, allocation concealment would not be applicable for case–control studies).

In addition, the reviewer is requested to complete in detail the comments section of the quality appraisal form so that the grade awarded for each study aspect is as transparent as possible. Each study is then awarded an overall study quality grading for internal validity (IV) and a separate one for external validity (EV):

- ++ All or most of the checklist criteria have been fulfilled, where they have not been fulfilled the conclusions are very unlikely to alter.
- + Some of the checklist criteria have been fulfilled, where they have not been fulfilled, or not adequately described, the conclusions are unlikely to alter.
- Few or no checklist criteria have been fulfilled and the conclusions are likely or very likely to alter.

Checklist

Study identification: Include full citation details

Study design:

Refer to the glossary of study designs (appendix D) and the algorithm for classifying experimental and observational study designs (appendix E) to best describe the paper's underpinning study design

Section 1: Population

1.1 Is the source population or source area well described?

Was the country (e.g. developed or non-developed, type of health care system), setting (primary schools, community centres etc), location (urban, rural), population demographics etc adequately described?

++

+

–

NR

NA

Comments: ALL SAME GRADING CRITERIA

1.2 Is the eligible population or area representative of the source population or area?

Was the recruitment of individuals, clusters or areas well defined (e.g. advertisement, birth register)?

Was the eligible population representative of the source? Were important groups underrepresented?

1.3 Do the selected participants or areas represent the eligible population or area?

Was the method of selection of participants from the eligible population well described?

What % of selected individuals or clusters agreed to participate? Were there any sources of bias?

Were the inclusion or exclusion criteria explicit and appropriate?

Section 2: Method of selection of exposure (or comparison) group

2.1 Selection of exposure (and comparison) group. How was selection bias minimised?

How was selection bias minimised?

2.2 Was the selection of explanatory variables based on a sound theoretical basis?

How sound was the theoretical basis for selecting the explanatory variables?

2.3 Was the contamination acceptably low?

Did any in the comparison group receive the exposure?
If so, was it sufficient to cause important bias?

2.4 How well were likely confounding factors identified and controlled?
Were there likely to be other confounding factors not considered or appropriately adjusted for?
Was this sufficient to cause important bias?

Section 3: Outcomes

3.1 Were the outcome measures and procedures reliable?
Were outcome measures subjective or objective (e.g. biochemically validated nicotine levels ++ vs self-reported smoking -)?
How reliable were outcome measures (e.g. inter- or intra-rater reliability scores)?
Was there any indication that measures had been validated (e.g. validated against a gold standard measure or assessed for content validity)?

3.2 Were the outcome measurements complete?
Were all or most of the study participants who met the defined study outcome definitions likely to have been identified?

3.3 Were all the important outcomes assessed?
Were all the important benefits and harms assessed?
Was it possible to determine the overall balance of benefits and harms of the intervention versus comparison?

3.4 Was there a similar follow-up time in exposure and comparison groups?
If groups are followed for different lengths of time, then more events are likely to occur in the group followed-up for longer distorting the comparison.
Analyses can be adjusted to allow for differences in length of follow-up (e.g. using person-years).

3.5 Was follow-up time meaningful?
Was follow-up long enough to assess long-term benefits and harms?
Was it too long, e.g. participants lost to follow-up?

Section 4: Analyses

4.1 Was the study sufficiently powered to detect an intervention effect (if one exists)?
A power of 0.8 (i.e. it is likely to see an effect of a given size if one exists, 80% of the time) is the conventionally accepted standard.
Is a power calculation presented? If not, what is the expected effect size?
Is the sample size adequate?

4.2 Were multiple explanatory variables considered in the analyses?
Were there sufficient explanatory variables considered in the analysis?

4.3 Were the analytical methods appropriate?

Were important differences in follow-up time and likely confounders adjusted for?

4.6 Was the precision of association given or calculable? Is association meaningful?

Were confidence intervals or p values for effect estimates given or possible to calculate?

Were CIs wide or were they sufficiently precise to aid decision-making? If precision is lacking, is this because the study is under-powered?

Section 5: Summary

5.1 Are the study results internally valid (i.e. unbiased)?

How well did the study minimise sources of bias (i.e. adjusting for potential confounders)?

Were there significant flaws in the study design?

5.2 Are the findings generalisable to the source population (i.e. externally valid)?

Are there sufficient details given about the study to determine if the findings are generalisable to the source population?

Consider: participants, interventions and comparisons, outcomes, resource and policy implications.

^[15]Appraisal form derived from: Jackson R, Ameratunga S, Broad J et al. (2006) The GATE frame:


critical appraisal with pictures. Evidence Based Medicine 11: 35–8.

^[16]Available from CPHE on request.

Methods for the development of NICE public health guidance (third edition) (PMG4)

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APPENDIX C Ethical Approval for Included Studies

From: Susan Cottam (Research Support Group) s.l.cottam@bham.ac.uk 
Subject: Application for Ethical Review ERN_15-1423
Date: 17 June 2016 at 12:17
To: Michael Larkin (School of Psychology) M.Larkin@bham.ac.uk, Fiona Lerigo (PhD Psychology Lab FT) FAL307@student.bham.ac.uk
Cc: Louise Dixon (School of Psychology) L.Dixon.1@bham.ac.uk

SC

Dear Dr Larkin and Ms Lerigo

**Re: “The role of trauma symptoms, paranoid ideation and emotional regulation in intimate partner conflict”
Application for Ethical Review ERN_15-1423**

Thank you for your application for ethical review for the above project, which was reviewed by the Science, Technology, Engineering and Mathematics Ethical Review Committee.

On behalf of the Committee, I confirm that this study now has full ethical approval.

I would like to remind you that any substantive changes to the nature of the study as described in the Application for Ethical Review, and/or any adverse events occurring during the study should be promptly brought to the Committee’s attention by the Principal Investigator and may necessitate further ethical review.

Please also ensure that the relevant requirements within the University’s Code of Practice for Research and the information and guidance provided on the University’s ethics webpages (available at <https://intranet.birmingham.ac.uk/finance/accounting/Research-Support-Group/Research-Ethics/Links-and-Resources.aspx>) are adhered to and referred to in any future applications for ethical review. It is now a requirement on the revised application form (<https://intranet.birmingham.ac.uk/finance/accounting/Research-Support-Group/Research-Ethics/Ethical-Review-Forms.aspx>) to confirm that this guidance has been consulted and is understood, and that it has been taken into account when completing your application for ethical review.

Please be aware that whilst Health and Safety (H&S) issues may be considered during the ethical review process, you are still required to follow the University’s guidance on H&S and to ensure that H&S risk assessments have been carried out as appropriate. For further information about this, please contact your School H&S representative or the University’s H&S Unit at healthandsafety@contacts.bham.ac.uk.

Kind regards

Susan Cottam
Research Ethics Officer
Research Support Group
C Block Dome
Aston Webb Building
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Edgbaston B15 2TT
Tel: 0121 414 8825
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Web: <https://intranet.birmingham.ac.uk/finance/accounting/research-support->

[group/Research-Ethics](#)

Please remember to submit a new [Self-Assessment Form](#) for each new project.

Click [Ethical Review Process](#) for further details regarding the University's Ethical Review process, or email ethics-queries@contacts.bham.ac.uk with any queries.

Click [Research Governance](#) for further details regarding the University's Research Governance and Clinical Trials Insurance processes, or email researchgovernance@contacts.bham.ac.uk with any queries

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Appendix D. Means, Standard Deviations, Range, Sample Size and comparison t test results for Questionnaire Data (Chapter 4.5)

| Scale/Study | Subscale | Norm scores | | | | Sample | | | | t-test (comparing sample and norm group) |
|---|-----------|--------------|--------------|--------------|-----|--------------|-------|--------|-----|--|
| | | Mean | SD | Range | N | Mean | SD | Range | N | |
| <i>IJS Mathes</i> | | | | | | | | | | |
| Males | | 139 | 35.69 | not reported | 42 | 145.42 | 37.45 | 67-201 | 26 | t(66) = 0.71 n/s |
| Females | | 127.04 | 36.02 | not reported | 48 | 132.25 | 33.51 | 43-224 | 224 | t(270) = 0.9646 n/s |
| Total | | Not reported | - | | 90 | 133.71 | 34.31 | 43-224 | 250 | |
| <i>MJS (Pfeiffer & Wong, 1989) tested by Elphinson et al., 2011; AUS Sample, Radev & Hedrih (2017) SERBIAN SAMPLE; Tani & Ponti (2016) ITALIAN SAMPLE</i> | | | | | | | | | | |
| Males | Emo (AUS) | 26.89 | 6.38 | 8-39 | 118 | 39.69 | 4.3 | 34-50 | 26 | t(142) = 9.74*** |
| | Emo(IT) | 29.88 | 8.64 | | 168 | | | | | t(192) = 5.67*** |
| Females | Emo (AUS) | 30.3 | 6.03 | 13-42 | 208 | 42.35 | 6.88 | 10-99 | 224 | t(430) = 19.30*** |
| | Emo(IT) | 33.79 | 5.97 | | 193 | | | | | t(415) = 13.46*** |
| Total Emotional | Emo (AUS) | 29.06 | 6.37 | 8-42 | 326 | 42.08 | 6.7 | 10-99 | 250 | t(574) = 23.77*** |
| | Emo(SERB) | 30.73 | 4.52 | | 500 | | | | | t(748) = 27.41*** |
| Males | Cog(AUS) | 8.4 | 4.5 | 5-27 | 118 | 21.19 | 10.36 | 8-43 | 26 | t(142) = 9.90*** |
| | Cog(IT) | 8.71 | 4.9 | | 168 | | | | | t(192) = 10.03*** |
| Females | Cog(AUS) | 8.32 | 3.98 | 5-26 | 208 | 20.57 | 10.44 | 8-56 | 224 | t(430) = 15.88*** |
| | Cog(IT) | 9.22 | 4.49 | | 193 | | | | | t(415) = 14.03*** |
| Total Cognitive | Cog(AUS) | 8.35 | 4.17 | 5-27 | 326 | 20.63 | 10.42 | 8-56 | 250 | t(574) = 19.36*** |
| | Cog(SERB) | 16.81 | 6.26 | | 500 | | | | | t(748) = 6.2487*** |
| Males | Beh(AUS) | 12.52 | 4.94 | 6-28 | 118 | 13.05 | 4.92 | 8-27 | 26 | t(142) = 0.50 n/s |
| | Beh(IT) | 12.47 | 5.73 | | 168 | | | | | t(192) = 0.50 n/s |
| Females | Beh(AUS) | 14.59 | 5.76 | 6-32 | 208 | 17.61 | 8.55 | 8-99 | 224 | t(430) = 4.27*** |
| | Beh(IT) | 15.97 | 6.39 | | 193 | | | | | t(415) = 2.19* |
| Total Behavioural | Beh(AUS) | 13.84 | 5.56 | 6-32 | 326 | 17.18 | 6.52 | 8-99 | 250 | t(574) = 5.75*** |
| | Beh(SERB) | 14.24 | 5 | | 500 | | | | | t(748) = 6.8358*** |
| <i>PS Fenigstein & Vanables (scale range 20-100)</i> | | | | | | | | | | |
| Males | | 43.3 | Not reported | Not reported | 214 | 39.65 | 14.72 | 20-64 | 26 | |
| Females | | 42.3 | Not reported | Not reported | 367 | 44.51 | 16.52 | 20-100 | 224 | |
| Total (no significant diff in norm between m & f) | | 42.7 | 10.2 | 20-100 | 581 | 44 | 16.38 | 20-100 | 250 | t(829) = 1.39 n/s |
| GPTSREF | | | | | | | | | | |
| <i>Non-Clinical</i> | | 26.8 | 10.4 | 16-72 | 353 | Total: 32.66 | 12.25 | 16-67 | 250 | t(601) = 6.33*** (sample from non-clinical group) |
| <i>Clinical</i> | | 46.4 | 16.4 | 16-80 | 50 | | | | | t(298) = 6.81*** (sample from clinical group) |
| GTPSPERS | | | | | | | | | | |
| <i>Non-Clinical</i> | | 22.1 | 9.2 | 16-77 | 353 | Total: 23.55 | 11.23 | 16-82 | 250 | t(601) = 1.74 n/s |
| <i>Clinical</i> | | 55.4 | 15.5 | 16-80 | 50 | | | | | |

* independent t test was calculated as insufficient data was to calculate a Mann-Witney U. Therefore equal variance was assumed.

Appendix E The Jealousy and Paranoia Scales and Analysis Labels

Paranoia Scale

| Item # | Narrative | Abbreviation |
|---------------|--|---------------------|
| TP 1 | Someone has it in for me | Soneinfor |
| TP 2 | I sometimes feel that I am being followed | SomeFollow |
| TP 3 | I believe that I have often been punished without cause. | Punish |
| TP 4 | Some people have tried to steal my ideas and take credit for them | StealCred |
| TP 5 | My parents and family find more fault with me than they should | ParentFault |
| TP 6 | No one really cares what happens to you | NoneCare |
| TP 7 | I am sure I get a raw deal from life | RawDeal |
| TP 8 | Most people will use somewhat unfair means to gain profit or an advantage | UnfairMeans |
| TP 9 | I often wonder what hidden reason another person may have for doing something | HiddenReas |
| TP 10 | It is safer to trust no one | NotTrust |
| TP 11 | I have often felt that strangers were looking at me critically | Strangers |
| TP 12 | Most people make friends because friends are likely to be useful to them | Useful |
| TP 13 | Someone has been trying to influence my mind | Infmind |
| TP 14 | I am sure that I have been talked about behind my back | Behindback |
| TP 15 | Most people inwardly dislike putting themselves out to help other people | Dislikehelp |
| TP 16 | I tend to be on my guard with people who are somewhat more friendly than I expected. | GuardFriend |
| TP 17 | People have often said insulting and unkind things about me. | Insult |
| TP 18 | People often disappoint me | Disappoint |
| TP 19 | I am bothered by people outside, in cars, in stores, etc. watching me. | PeopleWatch |
| TP 20 | I have often found people jealous of my good ideas because they had not thought of them first. | Jeallideas |

Green Paranoid Thoughts Scale

Persecution Subscale

| Item # | Narrative | Abbreviation |
|--------------------------------|--|---------------------|
| GPTS P1 | Certain individuals have it in for me | CertInfor |
| GPTS P2 | I have definitely been persecuted | DefPers |
| GPTS P3 | People have intended me harm | HavelIntend |
| GPTS P4 | People wanted me to feel threatened, so they stared at me | ThrtStare |
| GPTS P5 | I was sure certain people did things in order to annoy me | CertAnnoy |
| GPTS P 6 | I was convinced there was a conspiracy against me | ConvConsp |
| GPTS P7 | I was sure someone wanted to hurt me | SureHarm |
| GPTS P 8 | I was distressed by people wanting to harm me in some way | DistHarm |
| GPTS P9 | I was preoccupied with thoughts of people trying to upset me deliberately | PreoccUp |
| GPTS P10 | I couldn't stop thinking about people wanting to confuse me | PreConfuse |
| GPTS P11 | I was distressed by being persecuted | DistPers |
| GPTS P12 | I was annoyed because others wanted to deliberately upset me | AnnoyUpset |
| GPTS P13 | The thought that people were persecuting me played on my mind | PersePlay |
| GPTS P14 | It was difficult to stop thinking about people wanting to make me feel bad | FeelBad |
| GPTS P15 | People have been hostile towards me on purpose | HostPurp |
| GPTS P16 | I was angry that someone wanted to hurt me | AngHurt |
| <i>Self-Reference Subscale</i> | | |
| GPTS SR1 | I spent time thinking about friends gossiping about me | ThinkGoss |
| GPTS SR2 | I often heard people referring to me | HeardRef |
| GPTS SR3 | I have been upset by friends and colleagues judging me critically | DisFrndJdge |
| GPTS SR4 | People definitely laughed at me behind my back | CertLaughBehind |
| GPTS SR5 | I have been thinking a lot about people avoiding me. | ThinkAvoid |
| GPTS SR6 | People have been dropping hints for me | DroppingHints |
| GPTS SR7 | I believed that certain people were not what they seemed | NotSeemed |
| GPTS SR8 | People talking about me behind my back upset me | UpsetBehind |
| GPTS SR9 | I was convinced that people were singling me out | SingleOut |
| GPTS SR10 | I was certain that people have followed me | CertFollowed |
| GPTS SR 11 | Certain people were hostile towards me personally | CertHost |
| GPTS SR 12 | People have been checking up on me | Checkup |
| GPTS SR 13 | I was stressed out by people watching me | StressWatch |
| GPTS SR 14 | I was frustrated by people laughing at me | FrustLaugh |
| GPTS SR15 | I was worried by people's undue interest in me | WorryIntrst |
| GPTS SR 16 | It was hard to stop thinking about people talking about me behind my back | PreBehind |

JEALOUSY SCALES

Interpersonal Jealousy Scale

| Item # | Narrative | Abbreviation |
|---------------|---|---------------------|
| IJS 1. | If X were to see an old friend of the opposite sex and respond with a great deal of happiness, I would be annoyed | OldFriAnnoy |
| IJS 2. | If X went out with same sex friends, I would feel compelled to know what he/she did. | KnowDid |
| IJS 3. | If X admired someone of the opposite sex I would feel irritated. | Admires |
| IJS 4. | If X were to help someone of the opposite sex with their work/homework, I would feel suspicious. | WorkSusp |
| IJS 5.R | When X likes one of my friends I am pleased. | PleaseFriend |
| IJS 6.R | If X were to go away for the weekend without me, my only concern would be with whether he/she had a good time. | WendGood |
| IJS 7. | If X were helpful to someone of the opposite sex, I would feel jealous. | HelpJeal |
| IJS 8. | When X talks of happy experiences of his/her past, I feel sad that I wasn't part of it. | PastSad |
| IJS 9. | If X were to become displeased about the time I spend with others, I would be flattered. | TimeFlat |
| IJS 10. | If X and I went to a party and I lost sight of him/her, I would become uncomfortable. | PartySight |
| IJS11.R | I want X to remain good friends with the people he/she used to date. | FriendEx |
| IJS 12. | If X were to date others, I would feel unhappy. | UnhapDate |
| IJS 13 | When I notice that and a person of the opposite sex have something in common, I am envious. | CmmonEnv |
| IJS 14. I | If X were to become very close to someone of the opposite sex, I would feel very unhappy and/or angry. | CloseAngry |
| IJS 15. I | would like X to be faithful to me. | Faithful |
| IJS 16. R | I don't think it would bother me if X flirted with someone of the opposite sex. | NocareFlirt |
| IJS 17. | If someone of the opposite sex were to compliment, I would feel that the person was trying to take X away from me. | Tkenway |
| IJS18. R | I feel good when X makes a new friend. | NewFriend |
| IJS19. R | If X were to spend the night comforting a friend of the opposite sex who had just had a tragic experience, X's compassion would please me. | TragCompass |
| IJS 20. | If someone of the opposite sex were to pay attention to X, I would become possessive of him/her. | OhtrPossess |
| IJS 21. R | If X were to become exuberant and hug someone of the opposite sex, it would make me feel good that he/she was expressing his/her feelings openly. | GoodExpress |
| IJS 22 | The thought of X kissing someone else drives me up the wall. | Kissing |
| IJS 23. | If someone of the opposite sex lit up at the sight of X, I would become uneasy. | LitupUnease |
| IJS 24. | I like to find fault with X's old dates. | Faultfind |
| IJS 25. | I feel possessive toward X. | Possessto |

| | | |
|---------|--|-----------|
| IJS 26. | If X had previously been married, I would feel resentment towards the ex wife/husband. | Resentex |
| IJS 27. | If I saw a picture of X and an old date I would feel unhappy. | UnhapPic |
| IJS 28. | If X were to accidentally call me by the wrong name, I would become furious. | WrongName |

N.B. R after the item # indicates that the item is reverse scored

Multidimensional Jealousy Scale

| Item # | Narrative | Abbreviation |
|----------------------------|--|---------------------|
| <i>Emotional Subscale</i> | | |
| MJSEmo 1 | X comments to you on how great looking a member of the opposite sex is | GrtLookg |
| MJSEmo 2 | X shows a great deal of interest or excitement in talking to someone of the opposite sex. | ExciteTalk |
| MJSEmo 3 | X smiles in a very friendly manner to someone of the opposite sex | SmileFriendly |
| MJSEmo 4 | A member of the opposite sex is trying to get close to X all the time | OthrTryCl |
| MJSEmo 5 | X is flirting with someone of the opposite sex | Flirting |
| MJSEmo 6 | Someone of the opposite sex is dating X | OtherDate |
| MJSEmo7 | X hugs and kisses someone of the opposite sex | HugKiss |
| MJSEmo8 | X works very closely with a member of the opposite sex (In university or at work) | CloseWork |
| <i>Cognitive Subscale</i> | | |
| MJS Cog1 | I suspect that X is secretly seeing someone of the opposite sex | SusptSee |
| MJS Cog2 | I am worried that some member of the opposite sex may be chasing after X | WorryOthrChase |
| MJS Cog3 | I suspect that X may be attracted to someone else | SusptAttract |
| MJS Cog4 | I suspect that X may be physically intimate with another member of the opposite sex behind my back | PhyIntimate |
| MJS Cog5 | I think that some member of the opposite sex may be romantically interested in X | OthrIntst |
| MJS Cog6 | I am worried that someone of the opposite sex is trying to seduce X | SmeSedce |
| MJS Cog7 | I think that X is secretly developing and intimate relationship with someone of the opposite sex | SecrtDev |
| MJS Cog8 | I suspect that X is crazy about members of the opposite sex | CrazyAbt |
| <i>Behavioral Subscale</i> | | |
| MJS Beh1 | I look through X's drawers, handbag or pockets. | HndbgPoc |
| MJS Beh2 | I call X unexpectedly, just to see if he or she is there | UnexptCall |
| MJS Beh3 | I question X about previous or present romantic relationships | QstnPast |
| MJS Beh4 | I say something nasty about someone of the opposite sex, if X shows an interest in that person. | SmthgNast |
| MJS Beh 5 | I question X about his or her telephone calls | QstnPhone |
| MJS Beh 6 | I question X about his or her whereabouts | QstnWhere |
| MJS Beh7 | I join in whenever I see X talking to a member of the opposite sex | Joinin |
| MJS Beh 8 | I pay X a surprise visit just to see who is with him or her. | Surprise |

Appendix F · INDIVIDUAL ITEM FIT STATISTICS

F1 Interpersonal Jealousy Scale (IJS)

| <i>Item Name</i> | <i>Short Label</i> | <i>Chisq</i> | <i>p-value</i> | <i>Outfit MSQ</i> | <i>Infit MSQ</i> | <i>Outfit t</i> | <i>Infit t</i> |
|------------------|--------------------|--------------|----------------|-------------------|------------------|-----------------|----------------|
| IJS_14_1* | CloseAngry | 164.867 | 1 | 0.654 | 0.668 | -4.24 | -4.47 |
| IJS_23_1** | LitupUnease | 180.632 | 1 | 0.717 | 0.747 | -3.15 | -3 |
| IJS_3_1** | AdmireIrr | 185.052 | 1 | 0.734 | 0.697 | -2.89 | -3.73 |
| IJS_20_1** | OhtrPossess | 190.378 | 1 | 0.755 | 0.747 | -3.1 | -3.36 |
| IJS_17_1** | Tkenway | 191.895 | 1 | 0.761 | 0.791 | -2.92 | -2.67 |
| IJS_22 | Kissing | 203.31 | 1 | 0.807 | 0.944 | -1.26 | -0.41 |
| IJS_1_1** | OldFriAnnoy | 207.666 | 1 | 0.824 | 0.835 | -2.13 | -2.14 |
| IJS_27** | UnhapPi | 208.62 | 1 | 0.828 | 0.792 | -1.96 | -2.76 |
| IJS_7 | HelpJeal | 215.74 | 0.9 | 0.856 | 0.835 | -1.71 | -2.1 |
| IJS_13 | InCmmonEnv | 226.311 | 0.9 | 0.898 | 0.864 | -1.16 | -1.78 |
| IJS_4 | WorkSuspicious | 232.866 | 0.8 | 0.924 | 0.922 | -0.85 | -0.95 |
| IJS_26 | Resentex | 255.482 | 0.4 | 1.014 | 0.969 | 0.19 | -0.36 |
| IJS_25 | Possessto | 259.596 | 0.3 | 1.03 | 1.052 | 0.36 | 0.65 |
| IJS_2 | KnowDid | 297.163 | 0 | 1.179 | 1.038 | 1.94 | 0.5 |
| IJS_15 | Faithful | 321.838 | 0 | 1.277 | 0.947 | 0.86 | -0.09 |
| IJS_11R | FriendEx | 330.732 | 0 | 1.312 | 1.25 | 2.88 | 2.53 |
| IJS_24 | Faultfind | 352.588 | 0 | 1.399 | 1.251 | 4.02 | 2.93 |
| IJS_28 | WrongName | 374.375 | 0 | 1.486 | 1.251 | 3.92 | 2.64 |
| IJS_16R | NocareFlirt | 451.528 | 0 | 1.792 | 1.427 | 4.5 | 3.41 |
| IJS_12 | UnhapDate | 650.678 | 0 | 2.582 | 1.664 | 5.71 | 4.19 |

**Items Eliminated as t-value > +/- 1.96

F2 Multidimensional Jealousy Scale (MJS)

Itemfit statistics for MJS

| <i>Variable Name</i> | <i>Short Label</i> | <i>Chisq</i> | <i>p-value</i> | <i>Outfit MSQ</i> | <i>Infit MSQ</i> | <i>Outfit t</i> | <i>Infit t</i> |
|----------------------|--------------------|--------------|----------------|-------------------|------------------|-----------------|----------------|
| MJS_Cog1 | SusptSee | 143.942 | 1 | 0.576 | 0.717 | -2.67 | -2.78 |
| MJS_Cog7 | ThnkSecrtDev | 149.247 | 1 | 0.597 | 0.734 | -2.46 | -2.61 |
| MJS_Cog4 | SuspPhys | 160.709 | 1 | 0.643 | 0.776 | -2.05 | -2.17 |
| MJS_Cog6 | WorrySmeSedce | 179.798 | 1 | 0.719 | 0.739 | -2.82 | -3.66 |
| MJS_Cog3** | SusptAttract | 208.198 | 0.972 | 0.833 | 0.844 | -1.95 | -2.1 |
| MJS_Beh5 | QstnPhone | 216.509 | 0.932 | 0.866 | 1.053 | -0.76 | 0.54 |
| MJS_Cog2 | WorryOthrChase | 219.663 | 0.91 | 0.879 | 0.906 | -1.42 | -1.27 |
| MJS_Beh8 | SurpriseWho | 220.735 | 0.901 | 0.883 | 1.177 | -0.21 | 0.94 |
| MJS_Emo2 | ExciteTalk | 222.109 | 0.889 | 0.888 | 0.877 | -1.08 | -1.23 |
| MJS_Emo8 | CloseWork | 229.67 | 0.805 | 0.919 | 0.925 | -0.96 | -0.87 |
| MJS_Cog5 | ThnkOthrIntst | 232.13 | 0.771 | 0.929 | 0.952 | -0.86 | -0.61 |
| MJS_Emo4 | OthrTryCl | 234.529 | 0.736 | 0.938 | 0.931 | -0.48 | -0.51 |
| MJS_Beh4 | SmthgNast | 240.029 | 0.647 | 0.96 | 1.062 | -0.22 | 0.64 |
| MJS_Beh2 | UnexptCall | 245.16 | 0.557 | 0.981 | 1.012 | -0.04 | 0.14 |
| MJS_Emo1 | CommentLook | 248.939 | 0.489 | 0.996 | 0.957 | -0.01 | -0.43 |
| MJS_Emo3 | SmileFriendly | 255.012 | 0.383 | 1.02 | 1.02 | 0.24 | 0.25 |
| MJS_Beh6 | QstnWhere | 255.291 | 0.379 | 1.021 | 1.054 | 0.25 | 0.75 |
| MJS_Emo5 | Flirting | 261.804 | 0.276 | 1.047 | 0.915 | 0.38 | -0.48 |
| MJS_Emo7 | HugKiss | 266.86 | 0.208 | 1.067 | 1.003 | 0.6 | 0.06 |
| MJS_Beh3 | QstnPast | 276.513 | 0.111 | 1.106 | 1.092 | 1.33 | 1.31 |
| MJS_Beh1 | HndbgPoc | 305.206 | 0.009 | 1.221 | 1.087 | 0.8 | 0.51 |
| MJS_Emo6 | OtherDate | 306.673 | 0.007 | 1.227 | 0.966 | 1.32 | -0.14 |
| MJS_Beh7* | Joinin | 314.162 | 0.003 | 1.257 | 1.24 | 2.66 | 2.76 |
| MJS_Cog8 | SuspCrazyAbt | 394.172 | 0 | 1.577 | 1.017 | 2.62 | 0.18 |

F 3 Green Paranoid Thoughts Scale (G-PTS)

Itemfit Statistic for G-PTS

| <i>Variable Number</i> | <i>Short Label</i> | <i>Chisq</i> | <i>p-value</i> | <i>Outfit MSQ</i> | <i>Infit MSQ</i> | <i>Outfit t</i> | <i>Infit t</i> |
|------------------------|--------------------|--------------|----------------|-------------------|------------------|-----------------|----------------|
| GPTSP_8* | DistHarm | 112.196 | 1 | 0.462 | 0.882 | -2.34 | -0.62 |
| GPTSP_6* | ConvConsp | 114.303 | 1 | 0.47 | 0.894 | -2.35 | -0.57 |
| GPTSP_13* | PersePlay | 114.757 | 1 | 0.472 | 0.688 | -2.53 | -2.1 |
| GPTSP_7* | SureHarm | 119.315 | 1 | 0.491 | 0.834 | -2.06 | -0.88 |
| GPTSP_9* | PreocUp | 130.563 | 1 | 0.537 | 0.783 | -2.73 | -1.73 |
| GTPSP_12* | AnnoyUpset | 166.089 | 1 | 0.683 | 0.752 | -1.98 | -2.26 |
| GPTSP_4 | ThrtStare | 191.232 | 0.993 | 0.787 | 0.923 | -0.8 | -0.42 |
| GPTSP_15 | HostPurp | 191.993 | 0.992 | 0.79 | 0.918 | -1.41 | -0.74 |
| GPTSP_10 | Confuse | 193.002 | 0.991 | 0.794 | 1.003 | -0.89 | 0.07 |
| GPTSP_14 | FeelBad | 193.217 | 0.991 | 0.795 | 0.865 | -1.14 | -1.1 |
| GPTSP_11 | DistPers | 195.616 | 0.987 | 0.805 | 0.864 | -0.65 | -0.73 |
| GPTSSR_16 | HardThkBehind | 201.138 | 0.974 | 0.828 | 0.93 | -1.27 | -0.68 |
| GPTSSR_9 | SingleOut | 208.235 | 0.943 | 0.857 | 0.926 | -0.98 | -0.7 |
| GPTSSR_4 | DefLaugh | 225.475 | 0.77 | 0.928 | 0.958 | -0.53 | -0.42 |
| GPTSSR_1 | ThinkGoss | 229.72 | 0.705 | 0.945 | 0.818 | -0.5 | -2.26 |
| GPTSSR_5 | ThkAvoid | 231.331 | 0.678 | 0.952 | 0.999 | -0.33 | 0.02 |
| GPTSSR_14 | FrustLaugh | 231.381 | 0.677 | 0.952 | 1.041 | -0.29 | 0.44 |
| GPTSSR_2 | HeardRef | 242.16 | 0.485 | 0.997 | 0.844 | 0.02 | -1.69 |
| GPTSSR_13 | StressWatch | 248.863 | 0.367 | 1.024 | 1.204 | 0.21 | 1.9 |
| GPTSSR_3 | UpsetFrndJdge | 252.416 | 0.31 | 1.039 | 0.922 | 0.39 | -0.9 |
| GPTSSR_6 | DroppingHints | 256.942 | 0.243 | 1.057 | 1.038 | 0.37 | 0.35 |
| GPTSSR_11 | CertHost | 256.742 | 0.246 | 1.057 | 1.004 | 0.43 | 0.08 |
| GPTSP_1 | CertInfor | 260.954 | 0.192 | 1.074 | 1.145 | 0.5 | 1.27 |
| GPTSP_5 | CertAnnoy | 263.623 | 0.162 | 1.085 | 1.009 | 0.73 | 0.13 |
| GPTSP_2 | DefPers | 266.073 | 0.138 | 1.095 | 1.006 | 0.49 | 0.09 |
| GPTSP_16 | AngHurt | 278.29 | 0.054 | 1.145 | 1.097 | 0.73 | 0.72 |
| GPTSSR_8 | UpsetBehind | 279.934 | 0.047 | 1.152 | 1.144 | 1.5 | 1.68 |
| GPTSSR_7** | NotSeemed | 302.208 | 0.005 | 1.244 | 1.161 | 2.36 | 1.87 |
| GPTSSR_15* | WorryIntrst | 316.266 | 0.001 | 1.302 | 1.023 | 1.53 | 0.22 |
| GPTSP_3* | Havelntend | 323.821 | 0 | 1.333 | 1.119 | 1.38 | 0.82 |
| GPTSSR_10* | CertFollowed | 439.898 | 0 | 1.81 | 1.271 | 2.38 | 1.42 |
| GPTSSR_12* | Checkup | 509.26 | 0 | 2.096 | 1.876 | 6.31 | 7.23 |

Appendix G Script for instructions to participants before joint discussion recording

Before I switch on the video what I would like you to do is to think about a time that you've had a minor disagreement between you that you are happy to discuss and to have recorded during this session. I will give you about 15 minutes now in order to agree between you upon an occasion that you are happy to discuss today and I'll come back at the end of the time, is that ok?

AFTER THE AGREEMENT HAS TAKEN PLACE

So, have you agreed on a situation where you disagreed that you are happy to discuss today? (WAIT FOR RESPONSE). If yes, then go to section b) if No, Ok, so I can give you 5 more minutes if you like, any incident you think is suitable will be fine for today. So, now I will switch on the recording equipment, is that ok? (Get verbal consent)(Switch on equipment). Would you mind both stating that you are happy to go ahead with recording for the recording? (Get verbal consent)

Section b) So, maybe you can both take a couple of minutes to think about what happened from your point of view. (Pause for 2 minutes)

Then if you both tell me how it started and then developed and how you resolved or didn't resolve it. Who would like to go first?

(STOP AFTER 20 MINS OF RECORDING)

Thank you both very much. So, now I would like do go onto the separate response part of the study. Would you like a few moments before I take you through to the rooms?

Appendix H Couple Interview Script and Schedule

(Bring both partners back into the interview room) So, we recorded a video earlier and also you have no both responded to a series of questions about your discussion. What I would like to do now is to have a joint discussion, but first I would like us to watch the video recording from earlier. Can either of you please ask for the video to be stopped at any point when you think that the discussion is getting worse or more heated or that you notice that you are starting to feel upset, angry or anxious, or where you feel that you have been misunderstood or have misunderstood your partner, so that we can talk about that situation? Is it ok for me to switch that on now?

(Start the video. Stop where appropriate)

- 1) Please can you briefly describe in 2 or 3 sentences what you think was going on during the discussion.
- 2) At any point that you did feel anxious or upset can you tell us what was going on?
- 3) What did you think that your partner was thinking about you or intending during the discussion or at that moment?
- 4) How do you think your partner feels about the discussion that you have just had?

(As the participants explanation is exhausted)

Is it ok if we move on now?

Concluding questions at the end of the discussion section of the study:

- 1) What do you think should be done to resolve any disagreement that you had?
- 2) Through this discussion have you changed your mind about any of the above?

Appendix I Cued Recall Study Individual Written Question Sheet

PARTICIPANT No:

Couple No:

Information before you start.

It is known that people frequently think and feel things during conflict situations with intimate partners about the other's intentions and feelings that are both positive and negative. What I would like you to comment on are your **own thoughts** and **feelings/emotions** and also your insights into your **partner's motives** or **intentions towards you** or their **feelings/emotions** or alternatively to report your insights about your **own motives** and **feelings/emotions**.

Remember that if there are any thoughts or feelings that you would rather not discuss there is no need for you to do that. However, all your comments will be completely confidential and will not be discussed with anyone else including your partner. However, you should note that your partner may be able to identify your responses in the final report or research papers even though identifiers such as your name, age and locations will be changed, by reference to the discussion content.

What I would like you to do now is to answer a few written questions. If you could read through the following list of questions, I know that these are quite long but they are there to jog your memory. Please just write as much as you are happy with in response to the questions but try to answer them as fully as possible. Remember that the focus is on how you thought and felt, what you thought that the other person was thinking and the evidence that you used.

If you would please now write your responses to the questions below in the boxes below.

| Thoughts |
|---|
| Question 1a) What did you think about the conflict experience? <i>Specifically:</i> What thoughts ran through your mind? What did you think of the other person? |
| |
| Question 1b) What did you think they were thinking about you? |
| |
| <i>Specifically:</i> Can you tell me what evidence leads you to that conclusion? Did you consider that might have been due to something else, and if so what? How certain were you about your conclusion? |
| |
| Question 1c) What do you think that their intentions were towards you? |
| |

| |
|--|
| <p><i>Specifically: Can you tell me what evidence leads you to that conclusion? Did you think that might have been due to something else? How certain were you about your conclusion?</i></p> |
| <p>Feelings</p> |
| <p>Question 2a) Can you tell me about your feelings in the situation?</p> |
| <p>Question 2b) Did you feel anything else? <i>(This deals with the full range of emotions)</i> Did you have mixed feelings about that? <i>(This deals with the full range of emotions)</i> What did you do to manage that? <i>(This deals with retroactive emotional management)</i></p> |
| <p>Maintenance</p> |
| <p><i>So, this section of the discussion I would like to ask you some questions about how you manage the situation when you disagree with your partners</i></p> |
| <p>Question 3a) What was it about the situation and the events that lead up to it that meant that you felt and behaved in that way? <i>(This deals with situational context)</i></p> |
| <p>Question 3b) Did you do anything or think anything inside to make that feeling more manageable? <i>(Dampening down)</i> In relation to the original conflict what did you do to make sure that the situation didn't happen again? <i>(Antecedent focus)</i> Have you done anything to make sure that you don't get into the same situation again? <i>(Antecedent focus)</i></p> |
| <p>Preventative Actions</p> |
| <p><i>What I want to ask you now is if there are any actions or behaviours that you do or have tried to do since the</i></p> |

disagreement that you intended to reduce the chance of the difficulties that you talked about above from occurring again? All of my questions will relate to the situation that you were talking about with your partner.

Question 4a) In relation to the event you discussed, have you done anything to try and minimise, reduce, or prevent the threat from occurring? YES/NO If yes, please describe the actions and frequencies.

(Classify as Avoidance, In-Situation, Escape, Compliance, Help, Aggression or Delusional)

Question 4b) How does what you have done reduce or prevent the difficulty from re-occurring?

(The elements in blue on the response sheet refer to the theoretical basis of the question and will not be included in the final schedule as presented to the participants)

APPENDIX J THE SAFETY BEHAVIOURS QUESTIONNAIRE – PERSECUTORY BELIEFS (SBQ)

‘I would now like to ask you, in some detail, about any actions or behaviours that you may do to try to minimize or stop the threat from occurring; often we find that individuals who feel threatened do things that they think will provide some protection. All my questions will relate to the past month.’

Initial probe: **‘In the last month, have you done anything to try to minimise, reduce, or prevent the threat from occurring?’** YES☐NO☐ If Yes, please note actions and frequencies

.....

For scoring purposes, behaviours reported above should be classified into one of the categories below (i.e. Avoidance, In-Situation, Escape, Compliance, Help, Aggression, or Delusional)

Note : If at any stage of the interview it is unclear how a behaviour reduces threat, then the individual should be asked : ‘ How does that reduce or prevent the threat from occurring?’

‘That was a very general question. I’d now like to ask some more specific questions.’

1. Avoidance: **‘Sometimes, people who feel threatened avoid situations or activities in order to reduce the chances of the threat occurring. In the last month, have you avoided anything in order to reduce the threat?’** YES☐NO☐ If Yes, please note actions and frequencies

.....

‘Just to be sure we haven’t missed anything, I’m going to read a list of situations out loud to you. Do you avoid any of the following?’

- Shops
- Public transport
- Pubs
- Restaurants
- Meeting people or social gatherings
- Open spaces
- Enclosed spaces
- Staying at home alone
- Staying at home with others
- Being far from home
- Walking on the street
- Eating or drinking certain items

2b. This question is to be asked if threat is reported as actually happening : **‘ When harm is happening to you, are there any things that you do to try to lessen the impact ? ’** YES☐NO☐

If Yes, please note actions and frequencies

..... *3. Escape :* **‘ Another thing that people do is to leave a situation if they think that threat is very imminent or about to occur, for example, they might rapidly leave a shopping centre if they see someone they think is about to harm them. In the last month, have you quickly left a situation to avoid the threat ? ’** YES☐NO☐

If Yes, please note actions and frequencies

..... *If a response is given then ask about cues :* **‘ What made you think that threat was about to occur then?’**

..... *4. Compliance with persecutor’s demands/wishes:* **‘To reduce the chances of threat occurring, people may sometimes comply with, or give in to, the demands or wishes of the person who is trying to harm them. Do you do things to satisfy the person who is trying to harm you, in order to reduce the threat?’** YES☐NO☐ If Yes, please note actions and frequencies

..... *5. Getting help from others :* **‘ Occasionally, a person may try to get the help of others in reducing the threat, for example, asking friends to help or contacting the police or solicitors. In the last month, have you tried to enlist the help of anyone in reducing the threat?’** YES☐NO☐ If Yes, please note actions and frequencies

..... *6. Aggression:* **‘Lastly, people sometimes have tried to confront, or go up to, the person they think is trying to harm them – have you done that in the last month?’** YES☐NO☐ If Yes, please note actions and frequencies

..... *7. Delusional actions* (no question to be asked) Interviewer to list here any behaviours that are regarded by the person as reducing the likelihood of the threat, but that do not fit into any of the above categories and seem not to reduce threat in any

understandable way
Perceived effectiveness of safety behaviours, control of the situation, and rescue factors :

A. ‘Overall, how successful do you believe are these actions in reducing the threat? Please choose a number

2a. In-Situation Safety Behaviours : ‘ There may times when a person can’t avoid being in the very threatening situation. However, they may still try to do small, or subtle things, to try to minimize the threat. For example, if outside, they might try to be with someone, or keep near an exit, and, if inside, they might not answer the front door, or keep the curtains drawn or check the locks. They may also try to be very vigilant for threat. When you are in a situation in which you think that threat is about to occur, do you do anything to reduce the threat?’ YES☐NO☐
If Yes, please note actions and frequencies

.....

Yes☐NoYes☐No Yes☐No Yes☐No

Yes☐No

Yes☐No Yes☐No Yes☐No Yes☐No

Yes☐No

Yes☐No Yes☐No

Frequency

be between 0 (not at all successful) and 10 (extremely successful). ’

B. ‘Overall, how much control do you have over the situation? Please choose a number between 0 (no control) and 10 (total control).’ **C.**
‘Are there any factors that are beyond your control that may rescue you from the harm? – for example, something to do with the person trying to harm you or something to do with other people that may result in the threat not occurring’ YES☐NO☐ If Yes, please note details

D. ‘Overall, how successful do you think these rescue factors may be ?

Please choose a number between 0 (not successful) and 10 (totally successful). ’..... Note It must be remembered to obtain frequency ratings of the safety-behaviours. A card listing the frequency categories can be placed in front of the person :

Frequency of action. Please choose a number for how often the action occurred in the last month. (1, definitely occurred on at least one occasion; 2, occurred more than once but not frequently (e.g. not more than five times); 3, occurred frequently (e.g. at least five times); 4, present more or less continuously (at least every day).)

Interloper Video.

1
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3
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26
27
28 Speaker 2: (Ok so I made a friend here in one of my
29 classes, and he invited me out to have a drink, cos I
30 hadn't like/I've never had alcohol before I came here, cos
31 you're not allowed to drink back home.
32 that's the way I took it.) But when I presented the idea
33 it seemed very innocent. It didn't end up coming
34 across that way though and what did you/what was your
35 side of it. How did you feel when I was like, Oh man I'm
36 gonna go out for a drink with this male friend that I made
37 (laughing) #00:01:26-3#
38

friendship
social relationships
lack of experience
with alcohol
local
constraints

Conflict w/ understand
of others intentions
ME my understanding
- idea as performance
made different impression
to intended one.

You
soliciting P.O.V
present as though
presentation free
impression he got
(lightens it)
self-awareness
- aware of being
judged perceived for

Can't access that way
puts the responsibility on the

Source
Marking
INTENTIONS

SELF PRESENTATION
- SELF-AWARENESS

talk about
Different impression
to one intended.

39 Speaker 1: it seemed more like to me like if you know I
 40 that someone's never had a drink before, then your
 41 single. Then ... #00:01:35-8#
 42
 43 Speaker 2: the friend was single (to Interviewer)
 44 #00:01:36-3#
 45
 46 Speaker 1: Yeah and you ask them for a first time
 47 experience to go out and have a drink with them. It
 48 seems like you're trying to compete with someone.
 49 #00:01:46-6#
 50
 51 Speaker 2: or like get them drunk. Is that what you?
 52 #00:01:48-3#
 53
 54 Speaker 1: May not get them drunk, but like you can
 55 brag about how . #00:01:53-9#
 56
 57 Speaker 2: but had this experience together
 58 #00:01:56-3#
 59
 60 Speaker 1: Like yeah, because you know I was from the
 61 United States as well and had never gone drinking either.
 62 #00:02:01-1#

evidence selection

Giving evidence for threat + P.O.V.

Single/relationship status is highlighted as important

evidence clarifies

perhaps for her partner's benefit

Giving evidence for an account. perspective

Impression Experience Intuition about threat to relationship

A threat

Eliciting other point of view

Clarifying meaning

Sees this as competitive situation with another guy who is challenging him.

Reflects his concern about sharing/emotional meaning with another

Consensus (She reflects back his view)

Feeling excluded from a first experience locally

Experiential reasoning

Self-representational threat Competitive challenge

Source Marking

63

64 Speaker 2: yeah but we hadn't had that experience

acknowledge
US Feeling excluded

65 together so. But when I presented it, it didn't like ~~it~~ ^I was

Rational - not even
Talking about
things together.

66 trying to see like how it like actually went instead of

Needing to
gather more
evidence

67 jumping to conclusions. You know, like just go, and I was ^{ok}

Self Reason for bright
disagreement -

68 like ok. (Laughing) (And so, the reason it became a

because intent
evidence for
Branched structure.

69 conflict, was because I came back, and basically

70 my friend had kinda treated it as a date. And was kinda

Having intentions
misunderstood
unnerving/strange
address

71 like that's that's kinda weird, that I'm no, that was not

Self

72 what I intended. Male respondent was like, told you so

own

Marking that they
were right after
all in disagreement

73 Like how else could you not tell me so, (laughing) you

74 didn't tell me that there was gonna be creepy intentions

Not enough influence
given by partner as
they thought it
obvious

75 to this. So that was more more of the conflict, it was just

76 you, it totally, it was really obvious that it was, no it was

Ambiguous evidence
different conclusions

77 not obvious. And then then from there we kinda resolved

vs

Pivotal point for
resolution - evidence
typed?

78 the... #00:02:53-8#

79

80 Speaker 1: Well there were other interactions.

acknowledge
There is
more to this

81 #00:02:58-6#

word use
is interesting

82

83 Speaker 2: Yeah. #00:02:58-6#

Agreement

84

85 Speaker 1: Like he had tried to make on her, like there

Evidence - shift
Threat from
other's behavior

86 was a time when you'd been talking to. #00:03:03-7#

Time when

standing back from it
uncertainty
Information
Gathering
Waiting
Dramatic

space
weakened
others intentions
not being as
expected.

Sense of
responsibility
needed to
confirm
intuition/suspicion
"told you so"

Told you so
Pivot Point
Ambiguity
of interpersonal
situation

evidence
in behavior

87

weird

Speaker 2: Sounds weird. #00:03:03-7#

Use of weird again? What is weird?

89

Speaker 1: You'd been talking to like your mom, which was another issue. #00:03:09-1#

evidence - for which

highlight/ pointing out issues - problems

Cause of problems / evidence

92

Speaker 2: So the conflict started off as that

Start of problem but more complex make them us

one conflict, but it carried on because it's part of a

US

bigger issue. But it wasn't only an issue between us. So,

Our perspective understanding of other's intentions as positive/ capable

the main thing that was an issue was that I kept trying to

think that this person was like innocent intention. And

male respondent was like "no, he's kinda hopping

Difference in belief about intention of other.

in there. And I was having a

Repeat evidence - on how changed mind

conversation on Skype with my mom and he like showed

up. And he was like, "hey mind if I join and like. #00:03:39-

(Changing mind is gradual)

102 4#

103

Interviewer: Who was it that showed up? #00:03:39-4#

105

Speaker 2: My friend showed up. #00:03:42-4#

107

108

109

Speaker 2: and he had a whole Skype conversation

Evan hp (Garden)

111 with me and my mom. If he [mate respondent] doesn't
112 even do that . I just talk with my mom. #00:03:52-
113 7#

evidence -
Other male
theory - trying
to get close.

Same
marking
(when
establishing
facts)

115 Speaker 1: and another thing was like during that
116 time I had gone to work. And I come home and it
117 was 10 or 11 o'clock, it was 11. #00:04:05-0#

Inference about
sequence
Adding more
evidence
of
location

lateness (time)

119 Speaker 2: and you didn't have a key.

Perspective reactivity
- reflecting on
things that
cause discomfort
for the other.

121 Speaker 1: yeah, and I didn't have a key to the house.

lack of awareness
Others
mind

123 Speaker 2: I didn't realise he didn't have a key, so he
124 like kept calling and kept calling. And I just found it, cos I
125 was like talking so got off the Skype call and I was like,
126 oh I have phone calls. And like hey I didn't. And he was
127 like what are you at,, I need a key and and it sounded
128 shady, cos I was like he could hear my friend in the
129 background, and it was 11 o'clock at night. #00:04:25-0#

Self Reminiscent
lack of awareness
of other's situation

senary when
linked in speech

Sudden realization
/revelation of how
it must/might
appear to the other
(negatively)

interacting makes
aware.

Call-speaking
with him because
aware of his
perspective

Contextual
info
as evidence
Self-reflexivity
from his imagined
point of view.

131 Speaker 1: I could.

voice here

Intuition

anxiety

he connects
- phrases displeas
on call.

apprehension
when his view
Experiential

133 Speaker 2: he was like whoa. I I was aware that like oh

Intuition
Reasons

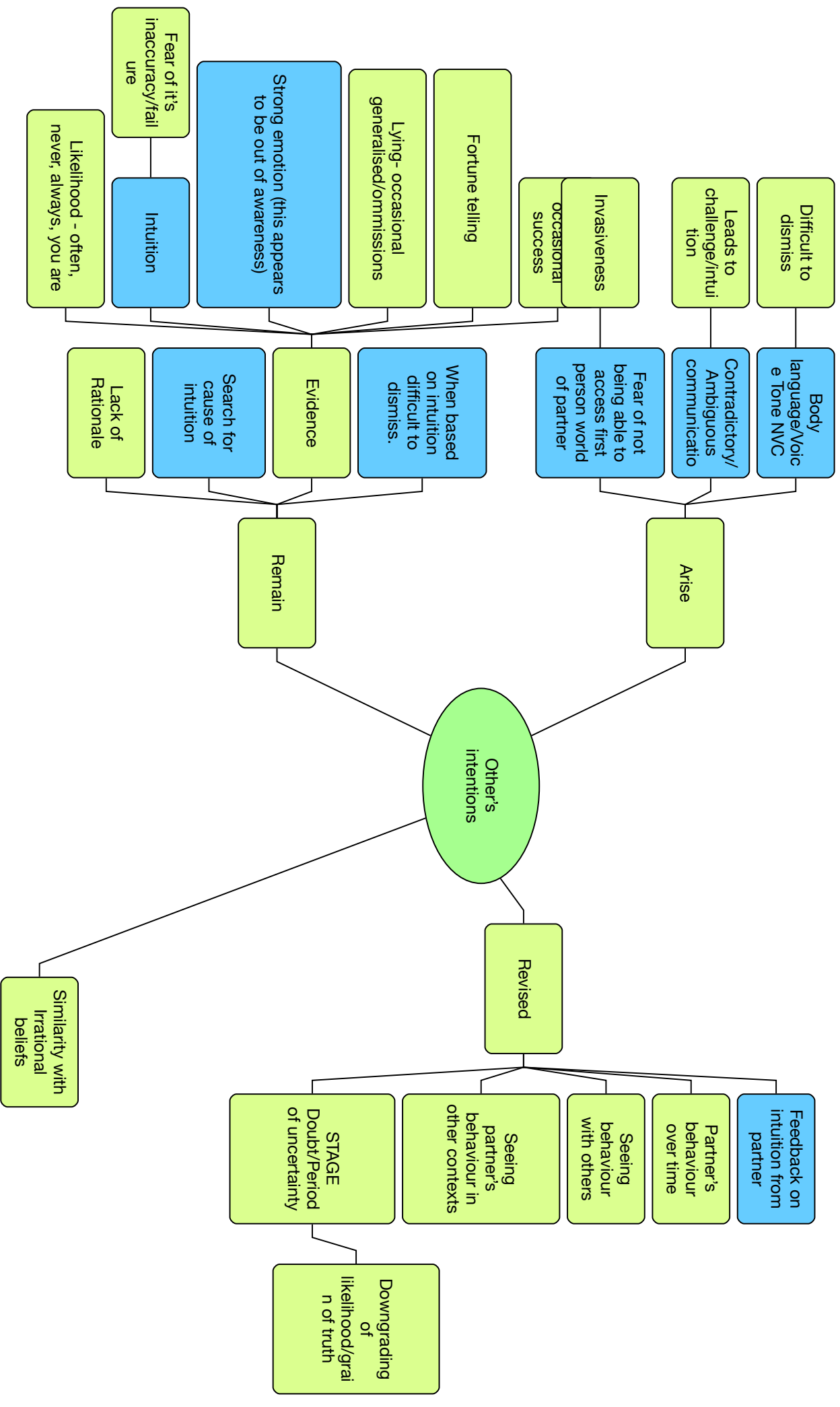
134 no, this isn't gonna end well. #00:04:32-0#

other
minds

for body

- because aware
of other's anger
+ that there
will be negative
consequences

based on experience of
his prior behaviour



DATA

- Files
- File Classifications
- Externals

CODES

- Nodes
 - Archive
 - Completed Coding**
 - Critical Codes
 - Inductive Codes

CASES

- Cases
- Case Classifications

NOTES

- Memos
- Annotations
- Memo Links

SEARCH

- Queries
- Query Results
- Node Matrices
- Sets

MAPS

- Maps

OPEN ITEMS

- Cued Recall Matrices
- INTERVIEW CODING CHECKLIST**

| Name |
|--|
| <ul style="list-style-type: none"> Belief Conviction <ul style="list-style-type: none"> Flexibility Rigidity Challenge <ul style="list-style-type: none"> Challenge triggers response to challenge Successful Challenge Unsuccessful Challenge Empathy <ul style="list-style-type: none"> Sympathy Understanding Evidence <ul style="list-style-type: none"> Disconfirmatory eviden... Intentions <ul style="list-style-type: none"> Other's intention Own Intentions Irrational Thinking <ul style="list-style-type: none"> Suspiciousness Misunderstandings Non content Information <ul style="list-style-type: none"> Body Language Voice Tone Thinking Style <ul style="list-style-type: none"> Experiential Intuitive R... Rational Thinking Valence <ul style="list-style-type: none"> Negative Neutral Positive |

INTERVIEW CODING CHECKLIST Code Annotations Edit

DATA

- Files
- File Classifications
- Externals

CODES

- Nodes
 - Archive
 - Completed Coding
 - Critical Codes
 - Inductive Codes

CASES

- Cases
- Case Classifications

NOTES

- Memos
- Annotations
- Memo Links

SEARCH

- Queries
- Query Results
- Node Matrices
- Sets

MAPS

- Maps

| Name |
|------------------------------|
| Power, voice, credibility |
| I believe you |
| I can understand you o... |
| Not credible I don't beli... |
| Not making sense- uni... |

Summary **Reference**

[Files\\Completed Framework Coding\\Couple 1 Interloper Video Transcript](#)
1 reference coded, 3.55% coverage

Reference 1: 3.55% coverage

Speaker 1: Well there were like other interactions. #00:02:58-6#

Speaker 2: Yeah. #00:02:58-6#

Speaker 1: Like he had tried to make on her. Like there was a time when you'd been talking to. #00:03:03-7#

Speaker 2: Sounds weird. #00:03:03-7#

Speaker 1: You'd been talking to like your mom... which was another issue. #00:03:09-1#

[Files\\Completed Framework Coding\\Couple 3 Scary Illness Interview Transcript](#)
1 reference coded, 1.34% coverage

Reference 1: 1.34% coverage

It's because I don't think that's true.

F: Do you not?

M: No.

F: Why?

M: Just don't. I don't think your predicaments, you have them before, but I don't think.

F: I know. I've had them quite a few times.

M: Yeah, but every time you ask me, there's not something wrong.

OPEN ITEMS

- Cued Recall Matrices
- INTERVIEW CODING CHECKLIST
- I believe you
- I can understand you or myself (now)
- Not credible I don't believe you