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The role of sex, gender role, and extraversion-introversion in explaining the experience, expression and control of anger

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The Role of Sex, Gender Role, and Extraversion-Introversion
in explaining the Experience, Expression and Control of Anger

James Oliver

A report submitted in Partial Fulfilment of the Requirements for the Award of Bachelor of
Arts (Psychology) Honours, Faculty of Computing, Health and Science,

Edith Cowan University.

Submitted (May, 2008)

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The role of Sex, Gender Role, and Extraversion-Introversion
in explaining the Experience, Expression and Control of Anger

Abstract

Anger is a frequently experienced emotion that has been shown to influence perceptions, beliefs, ideas, reasoning, and ultimately choices and actions. It has the potential to become a serious problem if it reaches dysfunctional levels. This study examines the role of biological sex, gender role, and extraversion-introversion in the expression, experience and control of anger. A sample of 110 persons drawn from the Australian community were administered the Staxi-2, EPQ-R and the BSRI. Results showed that extraversion-introversion accounted for most variance associated with anger expression, while gender role accounted for most variance associated with anger control. Biological sex was not significant in accounting for anger variance. This research has highlighted factors that correlate with different aspects of anger, and provides for a better understanding of anger as both an emotional and socially constructed force. The results are consistent with the view that biological factors probably best explain the expression of anger, but that socially constructed factors such as gender role may best explain the control of anger. Sustained research in this area will provide for improved understanding of how biological and social determinants interact in the expression and control of anger.

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Table of Contents

LITERATURE REVIEW.....	1
Abstract	2
Introduction	3
Anger Affect and Regulation	8
Anger: A Positive, Negative and Functional Force	10
The Biological Basis of Anger	15
Social Explanation of Anger Experience and Expression.....	17
Biological Explanation of Anger Experience and Expression.....	22
Summary of Social and Biological Explanations of Anger	25
Conclusions.....	26
References	29
Appendix A Guidelines for Contributions by Authors	36
PROJECT REPORT	42
Abstract	43
Introduction	44
Method	52
Results.....	55
Discussion	60
References.....	68
Appendix B Demographic Information and Test Instruments.....	74
Appendix C SPSS Output	79
Appendix D Guidelines for Contributions by Authors	92

Running head: ANGER EXPERIENCE AND EXPRESSION

(Literature Review)

Sex, Gender Role, and Extraversion-Introversion
in the Experience and Expression of Anger

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Abstract

Anger has lost its negative perception and is now viewed as both a positive or negative force. Anger has been a neglected research area compared to other affective states, possibly since it is a complex construct or as a result of it being confused with aggression and hostility. This review argues that anger is now perceived as more of a biological force than a socially developed one, and that anger is better explained from a motivational perspective than hedonic valence. Biological predictors such as the personality dimension extraversion-introversion may better explain anger experience and expression than predictors such as sex and gender role. A number of future research possibilities exist. One is to explore in greater depth biological predictors of anger such as the personality dimension or extraversion-introversion. Another is to develop predictors that have levels consisting of sex, gender role and extraversion-introversion. Moreover, more research into anger as a positive force is required. Finally, William's (2006) integrative neuroscience model of "Significance" has potential as a clear framework to develop new methodologies for the exploration of anger and other affective states.

James Oliver

Dr Ken Robinson

March 2008

SEX, GENDER ROLE, AND EXTRAVERSION-INTROVERSION
IN THE EXPERIENCE AND EXPRESSION OF ANGER

Individual behaviour is a combination of biological, psychological and social forces that are often accompanied by noticeable levels of emotion (Eagly & Wood, 2003). These forces interact over the life course where each life event produces a phenomenological experience that contributes towards the shaping of an individual's behaviour and well being, creation of personality and personality signatures as well as idiosyncratic person specific behaviours (Cozolino, 2006; Morf, 2006; Van Kleef & Co'te', 2007).

These biological, psychological and social forces are often intertwined with emotions that also form and shape a significant part of the human experience (Baumeister, Vohs, DeWall, & Zhang, 2007). Emotions are a frequent daily experiences for a person. For example Myrtek, Zanda, and Aschenbrenner (2001) monitored reported emotions of 50 female and 50 male university students every 20 minutes for a period of one day. They reported that women felt an emotion about 40 percent of the time and men about 30 percent of the time. Apart from the obvious limitations of a sample comprising of students and the small period of time monitored, this study demonstrates that emotions reach a level of arousal that can be recognized and that they form a large part of daily experience. Of the emotions it has been shown that anger is a common experience and is second only to happiness as the most experienced affective state (Averil, 1982; Myrtek et al., 2001; Scherer, Wranik, Sangsue, Tran & Scherer 2004).

While emotions such as anger provide some of the most powerful positive and negative affects a human can experience there is still much controversy over what emotions and their purpose is (Baumeister et al., 2007; Bower & Forgas, 2000; Buchanan, 2007; Scherer, 2000;). This controversy and the existence of multiple yet not incompatible theories that attempt to explain the wide range of phenomena associated with emotions contributes to the present limited understanding of emotions and leaves anger expression and experience only partly explained (Bean, 2005; Davis, 2004; Del Vecchio & O'Leary, 2004; Robbins, 2000; Wranik, 2004).

The controversy in the area has raised many recurring questions (Bean, 2005; Davis, 2004; Del Vecchio & O'Leary, 2004; Robbins, 2000; Wranik, 2004). These recurring questions include whether emotions directly or indirectly influence behaviour, whether they are dependent on cognition, or whether they are automatic affective responses (Baumeister et al., 2007). William James (1884, 1890) developed a view that emotions are a response to stimuli possessing intrinsic or reinforcing properties. James' theory has since been encompassed in the theory of self-perception (Strout, Sokol, Laird, & Thompson, 2004), that proposes that emotional behaviour is the cause of emotion feelings, rather than the reverse ("I flee, therefore I am afraid"). Empirical testing of self perception theory shows that inducing people to adopt facial expressions of emotion and adopting slouched or straight postures associated with positive or negative states leads to experiencing feelings associated with emotions of such induced states (Laird & Strout, 2007).

The literature may be summarised as finding that regardless of whether a person is of female or male sex, individuals are angered to similar degrees by similar stimuli and experience, and express anger in similar ways (Newman, Fuqua, Gray, & Simpson, 2006). Hyde (2005) has synthesised the findings of more than 46 meta-analyses, proposing a gender similarities hypothesis that males and females are similar on most, but not all,

psychological variables. Hyde's hypothesis has appeal, and reflects the literature, but is not new in that it replicates the findings of a watershed study in this area of over 2000 gender difference studies conducted by Maccoby and Jacklin (1974). Therefore in over 34 years, similarities and small differences have been the major findings in research seeking to explain psychological sex differences.

The small differences found may be due to the heterogeneity accompanying broad groupings such as females and males (Newman et al., 2006). It may be possible that these groupings may not be appropriate to properly account for anger variance, and therefore research must continue to search for better predictors that explain and help in the understanding of anger variance (Newman et al., 2006).

Recently Milovchevich, Howell, Drew, and Day (2000) addressed anger expression and experience and extended the research beyond sex to gender role. Their study built upon the work of Kopper (1993) and Kopper and Epperson (1991, 1996). Together these studies explored whether gender role provided a better predictor of the patterns of anger experience and expression than gender with the combined findings suggesting that gender role was a better predictor of anger than sex. These studies are briefly reviewed.

The Kopper and Epperson (1991) study examined the relationship of sex and gender role identity using self reports of 453 college students. Univariate analyses revealed consistent relationships between gender role identity and anger proneness, outward expression of anger, modulation or control of anger expression, and suppression of anger but not sex. The authors concluded that uni-dimensionally sex did not appear to be the determining factor in anger expression or suppression.

Kopper's (1993) investigation of 629 university students and the relationship of gender, sex role identity, and Type A behaviour using psychometric test for anger, depression, sex role, hostility, interpersonal behaviour and activity found significant

multivariate effects for gender role, $F(12, 1446) = 6.64, p < .0001$, and behaviour pattern type, $F(4, 480) = 3.93, p < .0038$, but not for sex or any of the interactions. Also found in his study was a consistent relationship for gender role and anger proneness, suppression, and control and the tendency to express anger outwardly and once again that sex was not a determining factor in the multiple dimensions of anger expression. This study found that masculine gender role types showed more proneness to anger and to express anger outwardly and less likely to suppress or control anger expression. In contrast feminine gender role types were least likely to express anger, more likely to suppress anger and control anger expression.

The study by Milovchevich et al. (2000) used a sample drawn from the Australian community, and found that gender role predicted anger experience, expression and control better than biological sex. In comparing sex, gender role and sex of target they found a significant main effects for gender role, $F(3,351) = 3.48, P < 0.001$. They also found that gender role was significant for state anger, $F(3,350) = 3.803, p < 0.01$; and for anger expression, $F(3,350) = 11.164, P < 0.0001$. No effect sizes were reported so critical values of F were compared to observed value of F. Critical F for Gender role main effect and state anger is $F(3,351) = 2.62, P < 0.001$, When critical F is compared to the reported observed F the findings are not large. In contrast the observed F for gender role on anger expression is large. Care though must be taken with the findings and must be kept in context as they are based on self reports.

The above studies showed consistently that gender role was a better and significant predictor than sex. Kopper (1993), and Kopper and Epperson (1991, 1996) identified gender role as a better predictor of anger. While the findings contribute to the understanding of anger experience and expression as well as their relationship with gender, the use of university students placed limitations on the findings to be generalised.

Additionally all the studies relied on self reports which have inherent potential to over report positive and under report negative personal characteristics. The methodological shortfall of self reports may possibly be overcome by using a person familiar with the participant, or by independent observer scoring. Milovchevich et al. (2000) continued to demonstrate the utility of gender role in anger research and by using a sample drawn from the Australian community reduced factors that limit the generalising of findings as a result of using university populations.

Biological factors are now emerging as stable and reliable predictors for exploring anger and other emotions (Gray, Burgess, Schaefer, Yarkoni, Larsen, & Braver, 2005). Neuroscience is demonstrating the role of brain structures in anger experience and expression, and showing anger is better explained through prefrontal and limbic system cortical structures and biological based personality dimensions (Kumari, ffytche, Williams, & Gray, 2007). Furthermore, the personality dimension of extraversion-introversion appears to be growing in recognition that it may better predict the expression and experience of anger than either sex or gender role (Richardson & Hammock, 2006).

While adherence to case and methodological comparison has been implemented, the literature review is biased more towards the theoretical aspects of anger. This is due to the limited depth of applicable research studies specifically relating to anger. Much research is confounded with aggression or hostility or relates to animal studies. The review that follows will examine aspects of anger affect and regulation, whether anger is a positive, negative or functional force, the basis of anger, and what might best explain anger expression and experience.

ANGER AFFECT AND REGULATION

Anger like other affective states, defined as feelings about an integral or incidental stimulus, is a complex construct with its experience possibly only fully understandable as an individual and phenomenologically unique experience (Eckhardt, Norlander & Deffenbacher, 2004; Griffiths, 2004; Peters, Västfjäll, Gärling & Slovic, 2006; Pfister & Böhm, 2008). As an affective state, anger shares the complexity associated with emotions in general (Eckhardt et al., 2004; Griffiths, 2004).

This complexity can be demonstrated by research showing that affective states can arise from immediate response to stimuli or as a result of anticipation of a future occurrence and that the same situation experienced by different people can evoke different emotions and levels of arousal (Loewenstein & Lerner, 2003). It has been proposed by Peters (2006) that the purpose of these affective states is to provide information to guide choices, focus attention and make certain kinds of knowledge more accessible, act as a motivator that influence approach avoidance tendencies, and act as a common denominator to make judgements and decisions through comparison of events on a common underlying dimension.

Anger is considered to be a primary and frequently occurring affective state. According to Averill (1982), anger is experienced one to two times a week, with the targets more likely to be friends and intimates than strangers. Scherer, Wranik, Sangsue, Tran, and Scherer (2004) surveyed 9000 German and Swiss adults, and found that anger was the second most experienced emotion after happiness. That study also showed that 70% of reported emotions were experienced without being experienced contemporaneously with other emotions. While the size of the survey would seem to provide reliability to their findings the limitation of the study is the survey is once again based on self reports and was only across two countries closely located geographically.

In addition to anger being a common experience, it is one of the few emotions that people can recognise quickly and accurately even while they are under cognitive load (Tracy & Robins, 2008). Initially thought of as cultural specific, anger understanding has evolved to encompass an interactionist perspective that views anger, emotional experience and expression as being both universal and cultural specific with familiarity with the culture determining the speed of emotion recognition (Elfenbein & Ambady, 2003).

As an affective state, anger can be experienced as a short lived emotional state arising from cognitive, somatic and environmental antecedents, or a mood which is a longer more enduring state that often has no identifiable antecedent associated with it (Bower & Forgas, 2000; Buchanan, 2007; Scherer, 2000). While these angry states are quite different in duration, they both have an affective impact on behaviour. Not only do these states provide information to self and others, but act specifically as incentives or deterrents, and as guide to one's and others behaviour (Buchanan, 2007; Peters, 2006; Van Kleef, & Co[^]te', 2007).

It has been demonstrated that anger affect may be cognitively regulated with people able to conceal, display, or modify its experience and expression in their interactions with others (Gross, 2002). In the area of regulation, Hochschild's (1983) theory of emotional labour is the dominant construct for understanding affect regulation. Hochschild proposes that regulation can occur through deep acting where experienced feelings are consciously modified and surface acting where emotional expression such as facial gestures, voice tone, posturing etc, are regulated without inner feelings being modified. Similar to Festinger's (1957) theory of cognitive dissonance, dissonance is more likely when incongruence between felt and expressed emotion occurs, such as when surface acting is employed (Grandey, 2003). Dependent on the level of distress experienced, more serious pathological outcomes may result (Grandey, 2003).

In summary, anger is a complex and frequently experienced affective state. As an affective state it can be short lived or of a longer duration. While at a basic level anger can be thought of as feelings about a stimulus it can also be regulated and appears to also have some key roles. These key roles for anger are to focus attention, provide information to self and others, and guide choices. Anger like most emotions is viewed as a common denominator in the making of judgements and action choices.

ANGER: A POSITIVE, NEGATIVE AND FUNCTIONAL FORCE

The extant literature and general public perception of anger has been biased towards perceiving anger as a negative force (Bean, 2005; Robbins, 2000; Del Vecchio & O'Leary, 2004). The classification of anger as a negative emotion is possibly due to the way many theorists classify emotions by looking at the eliciting situation rather than the motivation or outcome (Harmon-Jones & Sigelman, 2001). Given that situations involving anger are considered to be unfavourable or incongruent to individual goals, it is not hard to understand the negative categorisation applying to anger (Harmon-Jones & Sigelman, 2001).

More recently, this view has started to change with some now viewing the emotion as having a positive dimension (Bean, 2005; Van Kleef & Co'te', 2007). This changing perspective is associated with the view that the valence of anger is determined on the outcome of its manifestation, such as the harm done or whether the anger was perceived to be appropriate or legitimate (Del Vecchio & O'Leary, 2004).

Furthermore the positive aspect of anger may have been subsumed by the lack of a clear definition of anger that has seen anger, aggression, rage and similar affects treated interchangeably, or the limited research undertaken to date (Wranik, 2004). Additionally, failure to recognise all aspects of anger may be due to adopting a purely functionalist

approach to emotions in terms of phylo-ontogenetic continuity that looks at emotions too simply, and from a perspective of biologically primitive rather than biologically sophisticated and interpretable events (Massey, 2002, Wrانik, 2004).

Averill (1982) and Tavris (1989) both claim anger is a unique and complex human emotion and that animal studies are of limited value as animal behaviour involves aggression. Also the study of angry faces appears to be a popular research method, but this type of study focuses on anger perception and ignores the importance of anger feelings (Wrانik, 2004). Additionally, to explore anger as a simple emotion fails to recognise that it is currently regarded as a multidimensional construct consisting of physiological cognitive, phenomenological, and behavioural variables (Eckhardt et al., 2004).

How then best to understand anger? Since anger is an emotion it is often explained and conceptualised from a hedonic valence theory perspective of approach and avoidance which for most emotions is appropriate as the action tendencies associated with them conform to hedonic valence principles (Berkowitz & Harmon-Jones, 2004; Harmon-Jones & Sigelman, 2001). Yet if anger is a purely negative affect it does not conform to the principles of this theory, as when it manifests it does so usually as an approach rather than avoidance behaviour and therefore operates contrary to hedonic valence principles (Harmon-Jones & Sigelman, 2001). Another, and perhaps better, way to understand anger is from the most fundamental of human motivations where the goal is to minimize danger and threat, and to maximize pleasure (Gordon, 2000). Adopting this approach allows anger to be understood from a motivational perspective and allow the action of anger to be interpreted in terms of situated meaning and recognise it as a functional relationship between an individual and their environment (Witherington & Crichton, 2007).

The area of neuroscience where research has demonstrated that the prefrontal regions of the brain are asymmetrically involved in the expression and experience of

emotion provides one example that supports the view that anger may be better understood from a motivation goal congruent approach. Harmon-Jones and Sigelman (2001) clarified whether prefrontal asymmetrical activity is associated with emotional valence or motivational direction, and used electroencephalographic technology to monitor right and left prefrontal cortical activity of induced anger in 48 male undergraduate students. Their study found that the cortical activity increased in the left prefrontal cortex, an area associated with motivation rather than the right frontal cortex, an area associated with valence.

A study that perhaps shows that anger is best viewed from a motivational and situated perspective, and can be both a positive or negative force is a study by Vitaglione and Barnett (2003). They tested whether empathic anger motivated desires intended to help a victim or punish transgressors. This study is novel as empathy is generally associated with being congruent with sadness. The concept of anger as an action tendency of empathy is not new and was first proposed by Hoffman (1989). In their study, Vitaglione and Barnett administered questionnaires to 191 female and male college students and used descriptive analyses, correlation analyses, and path analyses to measure state empathic anger and sadness responses to an audio-taped appeal of a woman who was injured and the victim of a drunk driver. The study based on reported induced emotional effect of sadness or anger found that empathic anger appears to be a valid construal of the way in which some people experience empathy for a victimized person, and this experience has related motivational consequences including engagement in both helping and punishing behaviours that may also be viewed as prosocial.

From a methodological perspective laboratory induced emotional affect is better than no induced affect at all. The risk in this methodology though is that the environment and the experience is reasonably artificial and based on intended actions that are developed

without all potentially possible stimuli or conditions that reflect real life encounters.

Participant engagement may also not be genuine. Possibly the use of interviews of persons recounting real life experiences may be a better method of assessment.

Vitaglione and Barnett's (2003) study provides an opportunity for future research. While the authors recommend further study using sex to identify difference, this may be a limiting factor. As found by Maccoby and Jacklin (1974) and Hyde (2005) the use of sex as a predictor generally only finds small differences. Given research in anger as a positive force is sparse, the opportunity exists to examine anger and empathy from the basis of a socially constructed role or a biologically determined personality dimension.

It is difficult to find many examples in the literature that explore whether anger has hedonic valence or is motivationally based. Much of the literature puts forth theoretical perspectives or attempts to converge theoretical positions on emotions in general and this is perhaps an indication of the complexity of emotions. For example Williams (2006) proposes an integrative neuroscience model attempting to bring together both functionalist and dynamic systems perspectives. The model attempts to be significant by ensuring stimulus relevance to core motivations of minimise danger and maximize pleasure. A framework is proposed that brings together the areas of cognition and emotion, motivational theories of arousal and orienting and understanding of neural systems. The framework uses a temporal continuum in which significance processing can take place over milliseconds as unconscious and automatic processes, to seconds, in which memory is shaped, to minutes where the controlled and conscious mechanisms take precedence.

William's (2006) paper is worthy of thought and consideration as a framework to explore anger and develop anger research methodology. William's attempt at integration of quite different psychological domains is exemplary and is a serious attempt to converge views and provide a workable construct in which emotions like anger can be researched.

Integration and convergence is a good thing as it sets a clear guiding framework for research. A clear framework that embodies integration of competing theories and domains will contribute greatly to reducing confusion and uncertainty caused by the multitude of theories in the area of emotion (Bean, 2005; Davis, 2004; Del Vecchio & O'Leary, 2004; Robbins, 2000; Wrانik, 2004).

Anger is functional. At the intrapersonal level, anger has been shown to predispose thinking and behaviour towards self interest (Del Vecchio & O'Leary, 2004). This includes the removal of frustrations and blockages to goals (Zurbriggen & Sturman, 2002). Another feature of anger is that it has been shown to sustain persistence of endeavour and can strengthen commitment to an action (Turner, 2007). This commitment can be to personal change or improvement to ones own circumstances or applied at the community or macro level where actions can cause one to become involved in correcting perceived injustices, maintaining the status quo or becoming involved in community issues of importance (Boss, 2006; Fredrickson, Tugade, Waugh, & Larkin, 2003; Friedman, Olekalns, & Goates, 2004). Remembering that positive or negative is often a subjective judgement, the interpersonal and intrapersonal events just described would be associated with positive anger perceptions if that act was associated with an outcome of low harm to self or others, whereas a negative anger perception of these events would be where harm was perceived to occur or behaviour demonstrated low regard to others (Bean, 2005; Boss; Friedman et al., 2004).

In summary, anger is now seen as a force that is judged by how it is used or by its outcomes either on self or others. As a force, anger can therefore be both positive and negative. Anger also seems to be better explained as a motivational force rather than from a hedonic valence perspective. A motivational perspective allows anger to be thought of as a functional force that has a relationship with the environment and the meaning of the elicited

stimulus. Research in the area of neuroscience supports a motivational view and that anger is an unconscious and conscious action that occurs in milliseconds or over minutes or longer.

THE BIOLOGICAL BASIS OF ANGER

To examine the issue of the basis of anger, MacLean's (1973, 1990) concept of the triune brain provides a good framework for exploration. MacLean argues an evolutionary position that new brain capacities are developed by building on existing neural structures and not from scratch. Under this concept, the human brain currently has three different layers of neural anatomy. The oldest brain structure is the brain stem and cerebellum and maintains basic physiological functions. The second neural layer that evolved and that encompasses the first layer consists of the limbic system that also includes the amygdala, which is crucial in registering incoming emotional stimuli and storing emotional memories. The last and most recent neural layer is the neocortex that consists of an outer layer of grey matter mostly given over to the conscious processing of sensory stimuli.

MacLean (1973, 1990) further proposes, ignoring the first layer which is concerned with autonomic functions, that humans have both an emotional (limbic) and rational (prefrontal cortex) brain. These two structures work together in parallel and are linked by neural pathways to form a dynamic and interactive system where information moves in both directions between the two. Hence, the link between emotion and cognition is highly interactive. Under this concept each brain structure produces different perceptions and memory. In addition not only do unconscious emotional feelings exist independent of rational appraisals but given the significant number of neural connections running from the limbic system to the cortex it is more likely that emotional impulses may override rational cognition (Fishbane, 2007; Massey, 2002). Massey also provides further evidence that

emotions may dominate over rational cognition, where he reviews laboratory studies that show that the amygdala component of the limbic system receives incoming information a quarter of a second before it reaches the prefrontal cortex (Massey, 2002). Therefore emotion activates first before the rational brain can process information (Massey, 2002).

Support for a biological basis of anger in the form of existence of neural structures that activate cortical activity comes from a study by Damasio, et al. (2000). Forty-one non clinical participants were used to test a hypothesis that emotions are part of a multi-tiered and evolutionarily set of neural mechanism. The study used Positron Emission Topography to scan the whole brain for the activation associated with four primary emotions (sadness, happiness, anger or fear). The emotions were induced by the recall of personal emotional episodes. Rises in psychophysiological activity was found in all cases and preceded the subject's signal that the target emotion was felt. This effect supports the notion that the enactment of emotion precedes the feeling state and is a relevant finding for support of self perception theory.

The study found specific to anger, activation of a number of cortical areas that included the: dorsal pons, dorsal midbrain, hypothalamus, insula, anterior sector of the cingulate cortex, anterior pons, both sides of the midline cerebellum, right lateral cerebellum, lenticular nucleus, bilateral activation in the motor cortex. The study also tested a subset of 16 men and 16 women for difference in anger activation of cortical areas and found one significant difference in the left anterior insula that was engaged more prominently in women than men. The hypothesis of the study was supported and the findings extrapolated to form an opinion that the neural patterns found for all primary emotions depicted cortical structures of the mental states known as feelings. The results support the idea that part of the feeling-state of emotions might be grounded in emotion-specific neural patterns.

In summary, the physiological evidence shows that emotions such as anger are based in multi-tiered and evolutionarily sets of neural mechanisms. While the literature shows anger can be mediated either rationally or as a result of developmental forces, evidence from imaging technology of cortical activity appears stronger for a biological basis. MacLean's (1973, 1990) triune brain concept where brain structure build continuously on top of existing structures is compelling and is consistent with the evidence in the literature. Furthermore, Massey's (2002) suggestion of a rational and an emotive brain working in parallel, but with the emotional brain dominating also seems plausible.

SOCIAL EXPLANATION OF ANGER EXPERIENCE AND EXPRESSION

Anger, similar to other emotions, is heterogenic in that individuals experience and express it differently and to different levels of intensity (Davidson, 2005). There is also a strong belief that anger is expressed and experienced differently within and between groups or categories of individuals such as females and males, gender role types, and personality dimensions (Newman et al., 2006; Rothbart, 2007). As indicated earlier, most sex differences are marginal, possibly due to anger differences being subtle or difficult to obtain understanding of, or perhaps the right questions have not yet been asked (Newman et al., 2006).

While research has sought to understand the variance in anger, it does not seem to have explicitly examined whether anger is socially or biologically mediated. That is does sex, gender role, or a biologically based personality dimension better explain anger experience and expression. Given that anger so far seems to be primarily biological and can override rational thinking, yet appears to be influenced by socialisation practices of culture as well as situations applying to social interaction, it seems timely for the question raised earlier to be examined explicitly (Elfenbein & Ambady, 2003; Fishbane, 2007,

MacLean, 1973, MacLean, 1990; Massey, 2002). The question of whether anger is biological or socially constructed would fit well with H.J. Eysenck (1997) who encouraged the use all of the tools available to resolve problems as well as to integrate all aspects of psychology and the natural sciences in the pursuit of answers.

Anger expression and experience is influenced by nurturing and developmental processes commencing in childhood (Fishbane, 2007; Richardson & Hammock, 2006; Van Kleef & Co[^]te', 2007). These nurturing and development processes include perceived power or status in social interactions, or the value applied to a relationship or past experiences that provide reinforcement for how one is supposed to experience or express anger, and the internalisation of behaviours that develop gender roles, contribute to how a person may express and experience anger (Eagly & Wood, 2003; Fishbane, 2007; Richardson & Hammock, 2006; Van Kleef & Co[^]te', 2007).

Research shows that both females and males thrive on the positive impact of nurturing relationships on physical and emotional health, and that social rejection or exclusion may be a very undesirable experience (Goleman, 2006). It is not surprising that rejection is an unwanted experience with studies showing rejection activates parts of the brain associated with physical pain (Goleman). If it is assumed that preserving positive relationships and well being is a prime goal, then it is likely that anger experience and expression may be mediated by a multitude of social factors focussed on nurturing development and retention of important relationships or conforming to cultural norms and values (Evers et al.; 2007)

Nurturing factors assist with gender role development as a result of socialisation practices. The influence of socialisation on gender role development is probably best explained by gender schema theory. Gender schema theory was first proposed by Bem (1974), and the development of masculine and feminine roles was expanded by Taylor and

Hall (1981) to include androgynous and undifferentiated roles. Bem's theory asserts that from childhood a person is socialised into gender specific roles that tell them how they must behave and this manifests by directing their behaviour at the social level. These internalised socialisation experiences consolidate to direct behaviour and causes a person to act in culturally approved and gender stereotypic ways (Bem, 1974; Saucier, McCreary, & Saxberg, 2002).

Manstead and Fischer's (2001) concept of social appraisal complements the gender schema theory, as it builds upon the importance of appraisal of the social situation in mediating emotional events. Manstead and Fischer propose that appraisal is not limited to the situation of the social interaction during an emotional event, but also extends to the thoughts, feelings and behaviours of oneself and others. The appraisal plays a significant role in the way the emotion associated with that event is experienced and expressed, and these are influenced by the imagined social implications of these expressions (Manstead & Fischer, 2001).

Evers et al. (2007) undertook a study that examined whether the way anger is experienced and expressed is influenced by the imagined social implications of these expressions from a female and male schema perspective. The study involved 119 Amsterdam university students who were induced to believe that the partner, that they were paired with, had rated an essay written by them as poor. They found that men and women did not differ in their reports of experienced anger. However, they did differ in their expression of anger. Expression differed on the social context manipulation where participants had been led to believe that they would either meet or not meet the person who had angered them. Where participants thought they would not meet the person who had angered them, men and women did not differ in anger expression. However, in the social condition, where participants thought they would meet the person who had angered them,

women expressed their anger less than men did. The lower expression of anger for women was found to be associated with scores on social appraisal indicating that women were focussed more on the negative consequences of their anger expression. A univariate analysis of social appraisal showed that women reported stronger social appraisal than men, $F(1, 111) = 5.12, p < .026, \eta^2 = .04$.

Evers et al. (2007) provide support for how socialisation, the situation and the imagined consequences combine to determine how anger is expressed though not experienced. Furthermore given that anger expression and therefore control varies as an implied socialisation experience, it may have value in helping to understand how anger is or can be controlled. Since experience is similar across gender role, socialisation and cultural practices might be relevant but may not be significant factors for exploring anger experience.

Sex as a predictor of difference was first challenged by Maccoby and Jacklin's (1974) review of more than 2,000 studies over a wide variety of domains that found differences between sexes were not large, and that females and males were generally more similar than different. This finding not only spurred on the search for what could best explain differences, but also identified the limitations of using such a broad categorisation (Minton, 2000; Richardson & Hammock, 2006). More recently, Hyde (2005) reviewed 46 meta-analyses, and concluded that females and males were more similar than different.

These findings should not rule the category of sex out of research all together but when it is used its purpose needs to be clearly stated or when a difference is found it needs to be more intensely explored to identify why that difference exists. For example its usefulness and relevance to medical research where sex based physiological difference may be instrumental in assessing specific purpose medically focussed treatment trials.

As indicated previously sex should not be abandoned as sex and gender role can both be found to explain variation at levels of significance. This can be demonstrated by Kinney, Smith, and Donzella's (2001) study involving 445 United States college students that examined sex, gender role, self discrepancies and self awareness. Using regression analysis they found that anger repression was explained by masculinity and a desire to be masculine and public awareness; tendency to express anger was explained by sex, masculinity and public awareness. This study has value for a number of reasons. It implies that there is an interaction between sex and gender role and that the masculine gender role and male sex factors interact and demonstrate more anger expression than other types. Additionally, there is an effect of social forces such as public awareness and associated control perspectives on the expression and suppression of anger. Kinney et al. identify that gender role is better at explaining anger variance but sex can also explain anger.

Based on the interaction identified by Kinney et al. (2001), one's thinking is directed towards considering sex and gender role as complimentary and interchangeable factors that measure socially constructed psychological variables but at different levels. Under this proposal gender schema theory would be applicable to both sex and gender role. This removes the ambiguity of what is being measured when using sex as a measure of difference. Also sex would measure psychological variables of interest at a high level while gender role with more sub categories would measure these variables at more discriminant levels. Therefore a clear definition of what is being researched becomes explicit when using sex as a predictor of difference.

Furthermore both Hyde (2005) and Minton (2000) have raised concerns that the use of gender may be inappropriate due to unintended consequences. There is a risk of stigma and stereotyping associated with use of sex as a predictor, which therefore allows gender

role to be a better and less potentially politicised variable when accounting for the variance in anger response and expression.

While the literature suggests that gender role is a better predictor of anger variance than sex, the difficulty is that gender role type characteristics are affected by societal values and norms (Richardson & Hammock, 2006). The impact of this is important on two fronts. The first is reliability of measurement and the second is that psychological tests may be inaccurate unless they reflect the accepted norms and values of the times (Smiler, 2004). Because of these issues, gender role may not be the best variable for seeking explanation of variance associated with anger.

BIOLOGICAL EXPLANATION OF ANGER EXPERIENCE AND EXPRESSION

The comparison of biologically based predictors of anger with gender role appears to be a sensible way of gaining greater understanding of anger expression and experience. From a biological perspective, anger can be linked to states of arousal that include activation of the general sympathetic system and hormone/neurotransmitter functions (Buss, 2004). Earlier, this review demonstrated the role of the limbic system and particularly the amygdala and how it is the first brain structure to receive information.

Bo'ddeker and Stemmler (2000) summarise the findings of a number of studies using biological correlates. The studies that form part of the summaries show that trait anger is associated with experiential anger but not with heart rate responses. Trait anger was related to experienced anger and to higher physiological reactivity and anger suppression. Anger-in explained predicted negative mood, whereas anger-out was unrelated to anger experiences in daily life. Anger-out was related to higher physiological reactivity during harassment, and finally anger control correlated negatively with physiological reactivity. While these summarised results show inconsistency, Bo'ddeker and Stemmler

also found that studies assessing the relationship of the personality trait of extraversion to emotional anger experience have yielded more consistent results. Moreover, extraversion has consistently been related to less reactivity in negative emotions.

Bo¨ddecke and Stemmler (2000) recruited 80 German females and used anger self-reports, physiological reactivity (diastolic blood pressure, skin temperature at the forehead, and EMG extensor digitorum), and ratings of facial anger to explore anger response styles (anger-in, anger-out, or anger control). Participants were induced and assessed for anger on three occasions. The study found that habitual anger response styles did not predict actual anger styles, but extraversion did. The results showed that over each induction period treatment groups reported more anger than control groups, $F(1, 77) = 55.03, p < .01$. When the assessment of anger response and personality scores using forehead skin temperature (TMP), were inserted into the multiple regression equation, introverted subjects had a score of 1.12 in Treatment and of 0.98 in control. They also found that control subjects scoring low on extraversion reacted with high denial (stronger physiological and behavioural anger than experiential anger). Participants low on extraversion and who had undergone induced anger treatment showed the opposite, and demonstrated low denial. The results suggest that both the particular situation influences the anger response style. Bo¨ddecke and Stemmler recommended the use of a biologically based personality predictor to best explain anger experience and expression.

The extraversion–introversion personality dimension of Eysenck's (1967) is biological, and based on cortical arousal. According to Eysenck, introverts are cortically over-aroused and this causes them to be more restrained and inhibited and to seek non-arousing social situations with the goal to reduce external stimulation. Extraverts on the other hand have a state of lower internal arousal that causes them to manifest unrestrained and impulsive behaviours, and to seek highly arousing social situations to maximise

external stimulation. Therefore, extraversion and introversion personality type behaviour is focussed on maintaining an appropriate level of arousal (Bullock & Gilliland, 1993).

Extraverts experience more positive emotions than introverts (Mischel, Shoda, & Smith, 2004), and in relation to anger experience and expression, extraverts express anger due to their need for social dominance, and have lower anger control (Boeddeker & Stemmler, 2000). Introverts have been reported to have strong emotional reactions to anger and demonstrate high levels of anger expression and internal anger experience (Boeddeker & Stemmler, 2000).

Eysenck (1967) identified the ascending reticular activating system (ARAS) as the brain area responsible for differences in arousal between extraverts and introverts.

Eysenck's biological basis of personality is often contrasted to Gray's (1972,1981) Behavioural Inhibition System (BIS) associated with withdrawal or behaviour inhibition and introversion, and the Behavioural Activation System (BAS) that is associated with activation of approach behaviours and extraversion. Gray originally referred to his theory as a modernisation Eysenck's theory.

Support for the concept that cortical activity arousal relates to the personality dimension of extraversion-introversion has been found by Tran and McIsaac (2004) who assessed frontal, central and posterior brain regions activity in 50 participants. They recorded alpha rhythms in the 8-13 Hz range, and found that extraverts had lower cortical arousal than introverts.

Bono and Vey (2007) used 162 undergraduate students to assess two emotional regulation tasks requiring the expression of either anger or enthusiasm. Heart rate was used to measure personality incongruent actions. They found that when extraverts were asked to express a personality congruent emotion (enthusiasm), their heart rate decreased. In contrast, when they are asked to express a personality incongruent emotion

(anger/irritation), the heart rate of extraverts increased. Hence, personality and individual differences play a key role in successful emotional performance.

Kumari et al., (2007) investigated the influence of extraversion on cortical arousal using fMRI during a memory load task. Extraversion was assessed with the Eysenck Personality Questionnaire-Revised. Results were consistent with Eysenck's (1967) theory, which predicted that the higher the extraversion score, the greater the change in fMRI signal for the memory load task. Additionally, extraversion scores were negatively associated with resting fMRI signals in the thalamus and Broca's area extending to Wernicke's area, and showed a negative relationship between extraversion and resting arousal. Hence, the results from this study strongly support Eysenck's arousal model.

The biological explanation of anger using the extraversion-introversion personality dimension has intuitive appeal, and is supported by the literature (Gray, Burgess, Schaefer, Yarkoni, Larsen, & Braver, 2005). Extraversion-introversion may be a more reliable factor than gender role because the latter is associated with accepted stereotypical behaviour that may fluctuate over time as societal norms change (Richardson & Hammock, 2006).

SUMMARY OF SOCIAL AND BIOLOGICAL EXPLANATIONS OF ANGER EXPERIENCE AND EXPRESSION

The question raised previously was whether anger is socially or biologically mediated. The literature indicates that the factor of sex shows females and males are more similar than different, and that this may be due to the category being too broad or confounding interaction effects of social and biological factors. It has also been suggested that sex be viewed as a category that measures socially constructed psychological variables, but at a less discriminant level than gender role. From a socially determined developmental perspective, gender role has been shown to be a better predictor of difference and gender schema and social appraisal theory is helpful in explaining why this is so. There is

compelling evidence that a biological determined factor based on cortical arousal may be a better predictor of anger than socially determined factors. Current research shows that information passes through the limbic system, a biological cortical system and centre for emotion, before other areas of the brain such as the rational prefrontal cortex. Studies of the biologically based personality construct of extraversion-introversion show this construct to predict anger response styles better than habitual anger. Studies examining cortical arousal using alpha rhythms and fMRI methodology have found support for Eysenck's (1967) arousal theory of personality and support that a biological based personality dimension yield stable results when exploring differences.

In summary, there is strong argument that the biologically based personality dimension of extraversion-introversion is influential in researching both affective and socially constructed gender states. While there is agreement that gender role is a better predictor than sex, the literature suggests that there is a strong case for the biological based personality dimension of extraversion-introversion as a better predictor of anger experience and expression.

CONCLUSIONS

There is still much to be learned about emotional states and William James' (1884, 1890), question of "what is an emotion" is still unresolved. While biological, psychological and social forces shape human behaviour, these forces are intertwined with emotion. Emotional states such as anger are frequent experiences and can provide both powerful positive and negative experiences. Anger is a complex construct, and may be thought of as feelings about a stimulus. It has several important roles that include the focusing of attention, provision of information to self and others, and in guiding choices.

To understand anger it appears that it is best viewed as a motivational force rather than a hedonic valence. Neuroscience research supports a motivational view, and shows

that anger can be both an unconscious and conscious action that occurs in milliseconds or over minutes or longer.

Anger is no longer viewed as a solely negative force, but one that can be positive in nature with the outcome or its legitimacy determining whether it is judged positively or negatively. One of the complexities in understanding and researching anger is that like other emotions, anger is heterogeneous in that individuals respond differently to the same situation or challenge and appears to be culturally embedded.

From a methodological perspective the quest to explain human anger has been confounded with it being interchanged with aggression and hostility and the use of animal studies as well as confusion as to what anger is or how it functions. Also regular use of self reports has the potential of over reporting or under reporting of positive and negative personal characteristics, experiences, or intended actions. This shortfall could be improved by the use of a person familiar with the participant or a independent observer. Neuroscience though is providing methodology that will be useful in identifying cortical activity associated with predictors based on biologically based personality and rational thinking.

From a theoretical perspective, anger is now starting to be viewed more as an emotion that is based more in biological than social causes. This is demonstrated by emotional cortical structures seeming to take precedent in information processing over that of rational cortical structures. In addition while developmentally based social forces are influential and explain anger experience and expression more than sex, biological based predictors such as the personality dimensions of extraversion-introversion seem to be more stable and have better potential to explain anger experience and expression.

Further research opportunities exist to explore anger which is largely biological by using biological based personality dimensions such as extraversion –introversion.

Additionally while biologically based anger does seem to be mediated by social forces

which have been identified as both sex and gender role, further studies developing categories that are combinations of these predictors may also be useful in anger research and be able to explain more variance. Research into the positive affect of anger also presents an opportunity as it is an under researched area. Finally, William's (2006) paper that attempts integration of different psychological domains presents as a possible framework to explore anger and to use to develop anger research methodology.

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Appendix A

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[Submitting Supplemental Materials](#)

[Abstract and Keywords](#)

[References](#)

[Figures](#)

[Permissions](#)

[Publication Policies](#)

[Ethical Principles](#)

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Running head: ANGER EXPERIENCE AND EXPRESSION

(Report)

The Role of Sex, Gender Role, and Extraversion-Introversion
in explaining the Experience, Expression and Control of Anger

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The role of Sex, Gender Role, and Extraversion-Introversion
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Abstract

Anger is a frequently experienced emotion that has been shown to influence perceptions, beliefs, ideas, reasoning, and ultimately choices and actions. It has the potential to become a serious problem if it reaches dysfunctional levels. This study examines the role of biological sex, gender role, and extraversion-introversion in the expression, experience and control of anger. A sample of 110 persons drawn from the Australian community were administered the Staxi-2, EPQ-R and the BSRI. Results showed that extraversion-introversion accounted for most variance associated with anger expression, while gender role accounted for most variance associated with anger control. Biological sex was not significant in accounting for anger variance. This research has highlighted factors that correlate with different aspects of anger, and provides for a better understanding of anger as both an emotional and socially constructed force. The results are consistent with the view that biological factors probably best explain the expression of anger, but that socially constructed factors such as gender role may best explain the control of anger. Sustained research in this area will provide for improved understanding of how biological and social determinants interact in the expression and control of anger.

James Oliver
Dr Ken Robinson
May 2008

The role of Sex, Gender Role, and Extraversion-Introversion
in explaining the Experience, Expression and Control of Anger

Introduction

Biological, psychological and social forces intertwine with emotions to shape human behaviour (Baumeister, Vohs, DeWall, & Zhang, 2007). Their influence is not hard to understand given that emotions are frequently experienced (Averil, 1982), as demonstrated by Myrtek, Zanda, and Aschenbrenner (2001) who have shown that women felt an emotion about 40 percent of the time and men about 30 percent of the time on a daily basis.

Some emotions, such as anger are experienced and exhibited frequently (Scherer, Wranik, Sangsue, Tran, & Scherer 2004). Anger, defined as an internal state with emotional/experiential, physiological, cognitive, and behavioural components, is one such emotion that has consistently been shown to be a common experience (Averil, 1982; Eckhardt & Deffenbacher, 1995; Scherer et al., 2004). Anger has been shown to be second only to happiness as the most experienced affective state (Myrtek et al., 2001; Scherer et al., 2004).

While emotions such as anger provide some of the most powerful positive and negative affects a human can experience, there is still much controversy over what emotions and their purposes are (Baumeister et al., 2007; Bower & Forgas, 2000; Buchanan, 2007; Scherer, 2000). This controversy and the existence of multiple theories that attempt to explain the wide range of phenomena associated with emotions contributes to the present limited understanding of emotions, and leaves anger expression and experience as a segmented and partly explained phenomenon (Bean, 2005; Davis, 2004; Del Vecchio, & O'Leary, 2004; Robbins, 2000; Wranik, 2004).

It is an influential emotion that can foster confidence and action, yet if unregulated or poorly managed can lead to psychological, physical and core relationship problems (Derryberry & Tucker, 1994; Hansen & Hansen, 1988; Solomon, 1990). Dysfunctional anger may lead to violence or other negative behaviours and is often considered necessary to manage (Del Vecchio & O'Leary, 2004; Lerner & Tiedens, 2006; Novaco: 2007).

From a biological perspective, anger can be linked to states of arousal that include activation of the general sympathetic system and hormone/neurotransmitter functions (Buss, 2004). It has been proposed that the function of anger is to provide information to self and others in the form of incentives or deterrents and act as a guide to one's and others behaviour (Buchanan, 2007; Peters, 2006; Van Kleef, & Co'te', 2007). In addition, anger can be a short lived emotional state arising from cognitive, somatic and environmental antecedents, or it can be a mood which is a longer more enduring state that often has no identifiable antecedent associated with it (Bower & Forgas, 2000; Buchanan, 2007; Scherer, 2000).

MacLean's (1973) controversial concept of the triune brain provides one of several frameworks for exploring and understanding anger expression experience and control. MacLean argues an evolutionary position in that new brain capacities are developed by building on existing neural structures and not from scratch. Under this concept, the human brain currently has three different layers of neural anatomy. The oldest brain structure is the brain stem and cerebellum and this structure maintains basic physiological functions. The second neural layer that evolved and encompasses the first layer consists of the limbic system that also includes the amygdala, which is crucial in registering incoming emotional stimuli and storing emotional memories. The last and most recent neural layer is the neocortex that consists of an outer layer of grey matter mostly considered to be given over to the conscious processing of sensory stimuli.

MacLean (1973) further proposes, ignoring the first layer which is concerned with autonomic functions, that humans have both an emotional (limbic) and rational (prefrontal cortex) brain. These two structures work together in parallel and are linked by neural pathways to form a dynamic and interactive system where information moves in both directions between the two. Hence, the link between emotion and cognition is highly interactive. Under this concept each brain structure produces different perceptions and memory. In addition, not only do unconscious emotional feelings exist independent of rational appraisals but given the significant number of neural connections running from the limbic system to the cortex it is possible that strong emotional impulses may override rational cognition (Fishbane, 2007; Labar, Gatenby, Gore, LeDoux, & Phelps, 1998). Laboratory studies show that the amygdala component of the limbic system receives incoming information prior to the prefrontal cortex and therefore physiological arousal is potentially activated to noticeable levels prior to information processing by the rational brain (Labar et al., 1998; Myrtek et al., 2001).

Although MacLean's (1973) original concept has since been modified by others (e.g. Cory, 2002; Pribram, 1981), similar concepts have emerged in the neuroimaging literature (Cox & Harrison, 2008; Hewig, Hageman, Seifert, Nauman, & Bartussek, 2004; Labar et al., 1998). Findings from research have continued to reveal more about how the limbic system structures and the cortex are involved in behavioural choices. For example, a model of anterior asymmetry and emotion based on approach and withdrawal proposes two distinct brain systems are involved in behavioural regulation (Hewig et al., 2004). These systems for approach behaviour include the left dorsolateral, prefrontal cortex and the basal ganglia and withdrawal system includes the right dorsolateral prefrontal cortex, the right temporal polar region, the amygdala, the basal ganglia and the hypothalamus (Hewig, et al.). Cox and Harrison (2008), in examining anger from a psychophysiology,

neuropsychology and cognitive behavioural perspective, claim their research and neuroimaging studies show anger is a multifaceted construct subserved by complex systems of subcortical and cortical structures.

Furthermore, the literature shows that activation of cortical structures commence both emotional arousal and rational behaviour processes that drive learning and response behaviours, and result in the experiencing of affect (Labar et al., 1998). While the amygdala seems to activate for perceived threat, along with other cortical structures comprising the cortex, it has been shown that both an intact amygdala and ventromedial prefrontal cortex are necessary for effective goal directed behaviour (Labar et al. 1998; Bechara, Damasio, Damasio, & Lee, 1999).

Animal studies, including those using disconnection, demonstrate that motivational significance is encoded in the amygdala and then transferred to the prefrontal cortex for control of action, and that both motivational choice and appropriate social behaviour is guided by the effective interaction between the amygdala and the prefrontal cortex (Baxter, Parker, Linder, Izquierdo, & Murray, 2000; Rolls, 1999; Schoenbaum, Chiba, & Gallagher, 1998). Studies in cat and rats show that the amygdala is involved in the actual expression and not solely acquisition of negative emotions (Schoenbaum, et al. 1998; Phelps, O'Connor, Gatenby, Grillon, & Davis, 2001).

Experiments where participants believed they could control an anger inducing event by Harmon-Jones, Sigelman, Bohlig, and Harmon-Jones (2003) and manipulation of approach and avoidance imagination paradigms by Wacker, Heldmann, and Stemmler (2003) produced greater left frontal cortical activity suggesting anger expression is mediated by this region. Hewig et al. (2004) confirmed these findings, and further found that anger control is associated with right frontal cortical activity.

Therefore the concepts and data emerging from research make possible the view that brain structures have both specific and shared functions, operate in parallel but are also interactive and co-operative. Research on anger shows many brain areas are activated during an anger experience. In addition and importantly, limbic systems that interface with the left prefrontal cortex appear to have emotional roles that strongly determine expression while structures such as the right prefrontal cortex appear to have a role in control.

Biological based personality research using extraversion and introversion has found that this factor is associated with anger expression and experience. The extraversion–introversion personality dimension of Eysenck's (1967) is biological, and based on cortical arousal which is associated with the limbic system. According to Eysenck, introverts are cortically over-aroused and this causes them to be more restrained and inhibited and to seek non-arousing social situations with the goal to reduce external stimulation. Extraverts on the other hand have a state of lower internal arousal that causes them to manifest unrestrained and impulsive behaviours, and to seek highly arousing social situations to maximise external stimulation. Therefore, extraversion and introversion personality type behaviour is focussed on maintaining an appropriate level of arousal (Bullock & Gilliland, 1993).

Eysenck (1967) identified the ascending reticular activating system as the brain area responsible for differences in arousal between extraverts and introverts. Eysenck's biological basis of personality is often contrasted to Gray's (1971,1981) Behavioural Inhibition System associated with withdrawal or behaviour inhibition and introversion, and the Behavioural Activation System that is associated with activation of approach behaviours and extraversion (Larsen & Ketelaar, 1991). Gray originally referred to his theory as a modernisation of Eysenck's theory.

Bo"dder and Stemmler (2000) have found that studies assessing the relationship of the personality trait of extraversion to emotional anger experience have yielded consistent results. Their work has shown that extraversion is associated with greater anger expression, lower anger control and less reactivity to negative emotion while introversion is associated with strong emotional reactions to anger including high anger expression and a high internal anger experience (Bo"dder & Stemmler, 2000). It has also been shown that extraverts experience more positive emotions than introverts (Mischel, Shoda, & Smith, 2004), and in relation to anger experience and expression, extraverts express anger due to their need for social dominance, and have lower anger control (Bo"dder & Stemmler, 2000).

Another way to understand anger is from the most fundamental of human motivations where the goal is to minimize danger and threat, and to maximize pleasure (Gordon, 2000). Adopting this valence approach allows anger to be understood from a motivational perspective and allow the action of anger to be interpreted in terms of situated meaning and recognise it as a functional relationship between an individual and their environment (Witherington & Crichton, 2007). Support for anger as a motivational based force comes from neuro-imaging studies such as those of Hewig et al., (2004) who tested three constructs, affective valence, motivational direction and behavioural activation and inhibition. That study in examining frontal cortical asymmetry and anger out versus anger control found behavioural activation is related to approach and withdrawal motivation.

While extraversion-introversion and motivation appear to be factors in anger, behaviours are also learned and reinforced as part of socialisation (Bem, 1974; Bo"dder & Stemmler, 2000; Cox & Harrison, 2008). The learned socialisation effects on anger have been considerably studied with respect to the role of sex and gender role. Biological based sex differences have been well researched, and the use of meta-analytic studies such as

Maccoby and Jacklin's (1974) watershed study of over 2000 research reports, and more recently an analysis of 46 meta-analyses by Hyde (2005), have consolidated findings.

Anger research from a biological perspective shows that there are more similarities than differences in anger expression or experience between males and females (Hyde, 2005).

Hyde has proposed a gender similarities hypothesis that proposes males and females are similar on most, but not all, psychological variables. The small and often non significant differences found may be due to the heterogeneity accompanying broad groupings such as females and males (Newman, Fuqua, Gray, & Simpson., 2006).

Gender role has been proposed to explain anger expression and variance. Gender schema theory was first proposed by Bem (1974) and the original masculine and feminine roles was further expanded by Taylor and Hall (1981) to include androgynous and undifferentiated roles. Bem's theory combines aspects of social learning and cognitive-development, and asserts that a person is socialised into gender specific roles from childhood, and that these roles tell a person how they must behave and manifest by directing their behaviour at the social level. These internalised socialisation experiences consolidate to direct behaviour and causes a person to act in culturally approved and gender stereotypic ways (Bem, 1984; Saucier, McCreary, & Saxberg, 2002).

Recent research by Alia-Klein, Goldstein, Tomasi, Zhang, and Fagin-Jones, (2007) links social conditioning and subsequent emotion regulation based on this conditioning to the prefrontal cortex and in particular the orbitofrontal cortex (OFC). Their study used the words yes and no. These words have been universally linked to social conditioning, are used by both the individual and others as reinforcement, and are considered common but powerful feedback words. The OFC has been shown in other research to be the receiver of multimodal valence information as well as memory for previous punishment and reward associations (Zald & Rauch, 2006) and for signalling boundaries for accepting or rejecting

a choice of action (Elliot, Newman, Longe, & Deakin, 2003). Therefore, it may be concluded that social conditioning and socially conditioned behavioural choices are managed through structures in the prefrontal cortex.

Older studies by Kopper (1993), Kopper and Epperson (1991, 1996) and more recently by Milovchevich, Howell, Drew, & Day (2000) explored whether gender role provided a better predictor of the patterns of anger experience and expression than biologically determined sex. The combined findings suggested that gender role was a better predictor of anger than sex. Masculine gender role types showed more proneness to anger and to express anger outwardly and less likely to suppress or control anger expression. In contrast, feminine gender role types were least likely to express anger, more likely to suppress anger and control anger expression.

Despite the recent research developments, few studies appear to have explicitly or fully examined whether anger expression and control is socially and / or biologically mediated. Hence, while biological sex does not appear to be a significant factor in accounting for anger expression and experience, it does seem that socially constructed gender role and the biologically based personality dimension of extraversion-introversion together account for anger variance. The question naturally arises as to how these two dimensions would account for more of the variance in anger expression, experience, and control.

A useful tool to measure the expression and control of anger has been available in the form of the Staxi-2 (Spielberger, 1999). Given that extraversion-introversion may be easily measured, and that gender role may also be measured, the use of all three operationalised measures provides the opportunity to examine how they may interact in determining anger expression, experience and its control.

The purpose of this paper is therefore to examine the ability of biological sex, gender role and extraversion-introversion to explain the variance in anger expression, experience and control in a normal population drawn from the Australian community. The research question of this study is whether the reported experience, expression and control of anger of a person may be better explained by sex, gender role or by the personality dimension of extraversion-introversion?

Method

Research Design

This study uses a within-subjects correlation research design. Correlation research attempts to determine whether or not two or more variables are related in some way. Although correlation research does not determine causality between variables, it does show if there may be a relationship between them.

Self reported anger was the dependent variable and participant sex, gender role and extraversion were the independent variables. The dependent variable of anger had 4 levels, anger expression out (AX-O), anger expression in (AX-I), anger control out (AC-O) and anger control in (AC-I). Characteristics of the independent variables were as follows: participant sex, male and female; gender role was measured on four levels, masculine, feminine, androgenous, and undifferentiated; and introversion-extraversion had two levels, introversion and extraversion.

Participants

The study involved 110 participants ranging from 18 to 75 years of age ($M = 40.8$ years, $SD = 13.4$ years) sampled from the Perth Metropolitan and City of Bunbury areas of Western Australia. The Western Australian comparison average age is 36.4 years (Australian Bureau of Statistics, 2007). There were 63 females ranging from 18

to 68 years ($M = 41.6$, $SD = 13.4$) and 47 males ranging from 18 to 75 years of age ($M = 39.7$, $SD = 14.4$).

Sample Size

Sample size was determined using recommendations by Green (1991) who researched differing justifications for multiple regression sample size based on power analysis. The sample size of this study was determined on the assumption that a medium effect would be found and after applying Green's formula a sample size of 110 participants was determined.

Procedure

After receiving ethics approval for the study from the Ethics Committee of the Faculty of Computing, Health and Science of Edith Cowan University, questionnaires were distributed to participants. Participants had to be Australian citizens or hold permanent Australian resident status. Recruitment of participants involved directly approaching individuals or groups of people the researcher was familiar with, and requesting these persons to complete a set of questionnaires. Persons approached were also requested to nominate others who could also be approached to seek participation and these nominated persons were then contacted to complete the set of questionnaires. Of 17 participants who refused to participate, 14 were males and three were females.

Demographic Data Sheet

A demographic data sheet collected information on year of birth, sex, marital status, country of birth, residency status and occupation (Appendix B).

Instruments

Instruments for the study included the Spielberger State-Trait Anger Expression Inventory-2, the Eysenck Personality Scales and the BEM Sex Role Inventory (Appendix B).

The Spielberger State-Trait Anger Expression Inventory-2 (STAXI-2)

The Spielberger (1999) State-Trait Anger Expression Inventory-2 is a widely used 57 item self report measure of state and trait anger. The STAXI-2 has six scales, five subscales and an anger expression index. State anger measures current feelings and intensity of anger at a particular moment in time. Trait anger measures a trait disposition to experience and frequency of angry feelings. Anger Expression-Out measures the degree to which an individual expresses anger outwardly either verbally or physically, while Anger Expression-In measures the suppression of angry feelings. Anger Control-Out measures the prevention of the expression of anger outwardly towards others, while Anger Control-In measures the degree to which angry feelings are controlled internally. In the current study while participants completed all the scales the State and Trait Anger scales were not used. All scale items are rated on a four-point scale of 1 to 4. The inventory has been shown to have high internal consistency (Fuqua et al., 1991) and discriminative validity (Defenbacher et al., 1996).

The Bem Sex Role Inventory (BSRI)

The BSRI comprises 60 stereotypical personality characteristics, 20 feminine, 20 masculine and 20 filler items that are scored using a 7-point scale to record the degree to which participants believe are characteristic that describe themselves (Bem, 1981). The scale shows good reliability and internal consistency ranging from .90 to .93 and from .80 to .86, respectively (Renk et al., 2003).

Adult Eysenck Personality Questionnaire (EPQ-R)

The EPQ-R is a 106 item self-report questionnaire measuring three key dimensions of personality: extroversion-introversion (E), neuroticism or emotionality (N), psychoticism or tough-mindedness (P) and a lie scale (L) is also included (Eysenck & Eysenck, 1991). Responses are in a yes/no format. While participants completed the entire EPQ-R

questionnaire only the Extraversion-Introversion scale was used for this study. The EPQ-R has been shown to have satisfactory internal consistency and reliability (Ortet, Ibanex, Moro, Silva, & Boyle; 1999).

Procedure

The information sheet, informed consent form, demographic data sheet, Staxi-2, IVE, EPQ-R and BSRI were assembled into a package that could be given to participants. Participants were advised that the instruments should be completed as quickly as possible but no time limit was set. Those who agreed to participate were handed one of the test packages. For those unable to complete it at the time of approach, a time was arranged for it to be returned to or be collected by the researcher. As no participant reported experiencing any adverse consequence from participation or in completing the prepared package, no debriefing was conducted. This action was approved by the Ethics Committee.

Results

Data Processing and Screening

Data was analysed using SPSS Graduate Pack 15 student version release 15.0.0. for windows (SPSS, Chicago, IL). SPSS output data relevant to the analysis can be found at Appendix C. No data was missing and no questionnaires were discarded. Anger expression out (AX-O) was negatively skewed, platykurtic and the Kolmogorov-Smirnov with Lilliefors significance correction (K-S) statistic was $D(110) = .07, p > .05$. Anger expression in (AX-I) was negatively skewed, leptokurtic and the K-S statistic was $D(110) = .08, p > .05$. Anger control out (AC-O) was negatively skewed, platykurtic and the K-S statistic was $D(110) = .06, p > .05$. Anger control in (AC-I) was negatively skewed, platykurtic and the K-S statistic was $D(110) = .06, p > .05$. The data screening showed that AX-O and AXI had one univariate outlier each. As both scores for AX-O ($z = +3.02, p <$

.05) and AX-I ($z = +3.13, p < .05$) did not exceed $z = 3.29$ the original scores were retained for use in the analysis.

Bivariate Correlations

Bivariate correlations (Pearson's r in all cases) were computed to determine whether relationships were present between the independent variables (sex, gender role, extraversion-introversion), and the dependent variables (AX-O, AX-I, AC-O and AC-I). Scatter plots using the BEM Sex Role Inventory standard score for gender role and the Extraversion-introversion raw scores were analysed to test assumptions of normality, linearity and homoscedacity for each significant correlation. Examination of scatter plots did not suggest these conventional statistics assumptions had been violated. Table 1 presents correlations for all variables.

Table 1

Inter-correlations Among Variables

	Sex	Gender Role	Extraversion Introversion
Sex	1		
Gender Role	.172	1	
Extraversion-Introversion	.039	.149	1
Anger Expression Out	-.008	.074	-.285(**)
Anger Expression In	-.072	.013	.318(**)
Anger Control Out	.115	-.190(*)	.141
Anger Control In	.036	-.233(**)	.123

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 1 shows that sex did not correlate highly with any of the dependent variables.

Significant negative correlation was found between gender role and AC-O ($r = -.190, p < .05$) and ACI ($r = -.245, p < .01$). Extraversion-introversion was significant and negatively correlated with AX-O ($r = -.285, p < .01$), and significant and positively correlated with AX-I ($r = .318, p < .01$).

Multiple Regression Analysis

Multiple regressions were used to determine the variance explained by the independent variables for anger expression and control. Inspection of scatter plots, collinearity and Mahalanobis distance statistics showed no multivariate outliers and also that assumptions of normality, linearity, homoscedacity and independence of residuals were met. The enter method of analysis was used to determine the total variance explained by all independent variables, which operates to find the optimum entry order of predictor variables. Three analyses were performed. In the first analysis all independent variables were entered as one group in the first instance to explore the total variance accounted for as a single model. Next and based on the correlation results, only the significant variables of gender role and extraversion-introversion were entered into the model. In the final analysis, only the variable shown to be significant to the relevant level of the dependent variable was entered. Multiple regression results are reported in Table 2.

Table 2

Regression Coefficients From Enter Method Regression Analyses

Variable	Coefficients			T	Sig.	R	R ²
	β	SE β	Beta				
AXO							
Constant	17.80	1.42					
Sex	-.14	.79	-.017	-.18	.857	.000	-.009
Gender Role	.45	.35	.122	1.28	.202	.006	-.013
Extraversion-Introversion	-2.5	.78	-.30	-3.2	.002	.096	.070
AXI							
Constant	12.91	1.368					
Sex	-.668	.763	-.08	-.87	.383	.005	-.004
Gender Role	-.075	.338	-.02	-.22	.824	.006	-.013
Extraversion-Introversion	2.647	.756	.32	3.50	.001	.109	.084
ACO							
Constant	22.82	1.84					
Sex	1.63	1.03	.14	1.58	.116	.004	.013
Gender Role	-1.15	.45	-.24	-2.52	.013	.041	.058
Extraversion-Introversion	1.85	1.02	.17	1.81	.072	.061	.087
ACI							
Constant	23.38	1.90					
Sex	.77	1.06	.06	.72	.468	.001	-.009
Gender Role	-1.38	.47	-.27	-2.93	.004	.065	.047
Extraversion-Introversion	1.69	1.05	.15	1.61	.110	.087	.061

As shown in Table 2, sex was not significant as a predictor variable in accounting for anger variance for any of the dependent variables. Extraversion-introversion emerged as significant in accounting for variance for AX-O and AX-I, and gender role emerged as significant in accounting for AC-O and AC-I.

A second multiple regression eliminating non-significant variables was undertaken to determine the variance accounted for by the independent variable in the dependent variable. The results showed that for AX-O, the model was significant $F(1,108) = 9.58, p < .05$, and that extraversion-introversion accounted for 8.1% (adjusted $R^2 = .073$) of anger variance. Similarly for AX-I, the model was significant, $F(1,108) = 12.17, p < .05$ and that extraversion-introversion accounted for 10.1% (adjusted $R^2 = .093$) of anger variance. Gender role was significant for AC-O, $F(1,108) = 4.023, p < .05$ and accounted for 3.6% (adjusted $R^2 = .027$) of anger variance. Gender role was significant for AC-I, $F(1,108) = 6.22, p < .05$ and accounted for 5.4% (adjusted $R^2 = .046$) of variance for ACI.

Comparison of mean scores

The next phase of the analysis considered the actual scores obtained for each of the independent variables. Broadly, comparisons of mean scores indicated little difference in reported anger expression or control existed between each level of the sex variable. As might be expected from the previous analysis, differences emerged when comparing gender role and personality variables and their levels.

Mean scores were analysed for each independent variable (see Table 3 below). Each dependent variable had a score range of 8 to 32. The higher the individual score or mean for each of the independent variables indicated greater outward or inward anger expression, or greater outward and inward anger control, respectively.

Table 3

Mean scores and standard deviations for participants on independent variables

Independent Variable	AX-O	AX-I	AC-O	AC-I
<i>Sex</i>				
Female	15.30 (3.68)	16.51(4.51)	22.56 (5.19)	22.22 (5.69)
Male	15.23 (4.86)	15.91(3.40)	23.81 (5.71)	22.62 (5.31)
<i>Gender Role</i>				
Androgenous	15.47 (4.26)	16.00 (4.25)	24.42 (5.04)	24.26 (5.58)
Feminine	14.37 (3.28)	16.37 (3.54)	24.14 (4.79)	23.43 (4.48)
Masculine	16.06 (5.70)	16.24 (3.28)	21.76 (7.00)	21.18 (6.13)
Undifferentiated	15.64 (4.20)	16.28 (4.80)	22.08 (5.25)	21.08 (5.77)
<i>Extraversion - Introversion</i>				
Extraversion	16.34 (4.42)	15.10 (3.58)	22.41 (5.44)	21.79 (5.47)
Introversion	13.94 (3.53)	17.69 (4.21)	23.94 (5.34)	23.14 (5.52)
<i>Overall Mean</i>				
Dependent Variable	15.27 (4.20)	16.25 (4.07)	23.09 (5.43)	22.45 (5.58)

Note. Score range is 8 to 32.

Extraversion-Introversion

A number of means were analysed using t-tests with Bonferroni adjusted alpha levels of .006 per test (.05/8). Independent t-tests showed significant differences between the means of extraversion and introversion for AX-O, $t(108) = 3.09, p < .003, r = .28$ and for AX-I $t(108) = 3.48, p < .001, r = .31$. Extraversion means were greater for AX-O while means for introversion were higher for AX-I. Hence, extraversion types reported more AX-O and less AX-I behaviours while the reverse applied to introversion types.

No significant differences were found between the extraversion means for AX-O and AX-I, $t(60) = 1.68, p > .098, r = .21$ and this may indicate that extraversion types report and/or express and experience anger at similar levels. Conversely, analysis of the introversion dimension found a significant difference between the AX-O and AX-I introversion means, $t(48) = -6.10, p < .000, r = .66$. As evidenced by the effect size, the finding shows that for introversion types the reported expression outward of anger is significantly less than the reported expression inward of anger.

Analysis using t-tests on mean scores for AC-O and AC-I showed no significant differences for extraversion or introversion. While extraversion and introversion mean

score comparisons appear similar in reported AC-O behaviours and differ on reported AC-I behaviours, no significant differences using t-tests were found either within or between these variables.

Biological Sex

Inspection of mean scores showed little difference in anger expression or control between females and males. Independent t-tests confirmed no significant difference between sex for all anger expression and for anger control.

Gender Role

No significant differences were found between any of the sex-role types for AX-O, AX-I, AC-O or AC-I. The Female sex-role type had the lowest mean score for AX-O and male sex-role type had the highest. Female types therefore reported fewer AX-O behaviours and male types reported more AX-O behaviour, although this was not significant using independent group t-test. Androgenous and undifferentiated sex-role types appeared similar in reported AX-O behaviour, as there were no significant differences. No significant differences from analysis with independent t-test were found for any gender role type in the AC-I means.

Male types had the lowest mean score for AC-O while androgenous types had the highest mean scores but analysis with independent t-test shows no significant difference, AC-O, $t(34) = -1.31, p > .197, r = .21$. Male and undifferentiated type means for AC-I were lower than that for androgenous and female types, but no significant differences were found $t(56) = -1.99, p > .051, r = .25$.

Discussion

This study examined the role of sex, gender role, and extraversion-introversion in explaining the expression, experience and control of anger. Given the limited predictor set obtained in the study, the personality dimension of extraversion-introversion best explains

the expression of anger, while the socially constructed or learned gender role types best explains the control of anger. Biological sex did not emerge as a significant factor in explaining the experience, expression and control of anger.

Arousal as measured by extraversion-introversion has been shown to account for anger expression. Gender role was shown to be a significant factor in outward and inward control of anger and that expression and experience was similar for each gender role type, as might be expected from the literature on learned socialisation (Hyde, 2005; Kopper, 1993; Kopper & Epperson, 1991, 1996; Milovchevich et al., 2000). The results of the study support the extant literature that there are few differences on psychological variables for biological sex types of male and female. Furthermore the results appear to lend support to Hyde's (2005) gender similarities hypothesis that proposes that males and females are similar on most, but not all, psychological variables.

The literature shows that extraversion is associated with greater anger expression and lower anger control, and that introversion is associated with strong emotional reactions to anger including high anger expression and a high internal anger experience (Bo"dder & Stemmler, 2000). This study while supporting the literature shows that extraversion is associated with greater anger expression than introversion and that extraversion-introversion is a greater factor than gender role in accounting for the variance in the outward expression and inward experience of anger.

Note that both applied use and research on extraversion-introversion place importance on the bipolar nature of introversion and extraversion, and the associated measures of low and high scores that are used to determine labels. It is possible that measures of levels of arousal might be more appropriate (Bienvenu et al., 2007; Pelegrina, Beltran, & Gimenez, 2007). Such an approach integrates the past work of Eysenck with current physiological and behaviour research, and considers introversion-extraversion as

arousal. Arousal seems appropriate as a measure given the results obtained in this study. Extraversion may therefore be redefined as low arousal and high anger expression, while introversion redefined as high arousal and low anger expression.

Acceptance of the key role of arousal is probably critical to improved understanding of anger, as what is required is a framework for exploration based on cortical activation and parallel or co-operative brain systems linked by neural pathways. These pathways consist of emotional and automatic and rational processes working co-operatively to assess and respond to information based on levels of cortical activation which is synonymous with arousal. The results of this study link emotional expression and experience to the dimension of extraversion and introversion which is according to Eysenck (1967) associated with the limbic system.

The results show systematic differences in terms of the outward expression and inward experience of anger when considering extraversion-introversion. The means for extraversion show that anger outward and inward may be experienced at similar levels to each other. Therefore the manifestation of and intensity of anger expression and experience in the form of behaviour and feelings may be analogous to each other. For introverts, the intensity of anger expression and experience in the form of behaviour and feelings are different. This difference seems to be that the intensity of anger experience in the form of arousal or feelings may be different to anger expression. In keeping with the literature, introversion is therefore associated with less anger expression but greater anger inwards experience. It is suggested that these differences may be a result of individual perceptions, how one takes in information, as well as memories of past experiences associated with outcomes (Clack, Allen, Cooper, & O'Head, 2004).

The results of this study have also indicated a direction for understanding gender role, which was found to be linked to anger control. This is a deliberate conscious cognitive

process which is associated with the right frontal cortex and behaviour regulation or control. Therefore, we may begin to understand anger within a framework that accepts that different emotional and rational brain areas co-operate to form systems but that one or the other may dominate at different moments in time and that these drive how anger is expressed, experienced and controlled.

As shown by the literature reviewed in this study learned socialisation is an important determinant of behaviour, especially behaviour control. While gender role was not shown to be a significant factor in either the outward expression or inward experience of anger, it was shown to be a significant factor in the outward and inward control of anger. The extant literature shows gender role has a consistent relationship for anger proneness, suppression, and control and the tendency to express anger outwardly (Kopper, 1993). Furthermore, the masculine gender role types show more proneness to anger and outward expression of anger and are less likely to suppress or control anger expression. In contrast, feminine gender role types were less likely to express anger, more likely to suppress anger and control anger expression (Kopper, 1993). The results of this study differ from that of the literature perhaps because of the type of analysis or sample size. This study found that there were no differences between gender role types in the outward control of anger where anger is prevented from manifesting or in the inward control of anger where anger affect is reduced. Therefore, it could be concluded that differences in the outward and inward control of anger between gender roles are minor. Furthermore, the results indicated that each gender role is similar in the way anger is monitored and prevented from externalising and the affect from the anger causing event is reduced.

Alternatively, the similarities or non significant differences found in this study may simply indicate that the survey was not sensitive enough to measure gender role differences. In comparison to other studies of the effect size found, Kopper (1993) for

example found that for Type A behaviour, sex, gender role and anger out, $R^2 = .0884$; anger in, $R^2 = .0996$; and anger control, $R^2 = .0680$.

In summary, the results of the present study show that the role of sex in explaining the experience and expression of anger is not significant and that anger expression and experience is more similar than different between biologically determined sex types. Furthermore the study shows that the expression and experience of anger appears to be similar for both male and female biological sex types consistent with Hyde (2001).

The strength of the study is that it has contributed to an area of limited research when compared to other psychological dimensions of interest in the field of emotion. The current study, however, is limited to arousal as measured by extraversion-introversion and learned socialisation as measured by gender role. Furthermore, the results show that extraversion-introversion and gender role explain only comparatively low levels of explained variance. This indicates that other factors must also be involved and the challenge is to define and find these factors.

The present research may be original in the comparison of the three variables, sex, gender role and extraversion-introversion. While each variable has been examined in the literature to varying degrees and biological sex and gender role compared there has been no studies exploring the three variables together. More specifically, no studies have been found that address both factors of extraversion-introversion and gender role that from this study appear to provide some explanation of the role of biological personality dimensions and socialisation. This study will assist to provide some common foundation possibly across competing psychological disciplines and this may lead to improved understanding of the emotion of anger.

The use of a population drawn from the Australian community rather than from university populations is a significant factor that will allow generalising of results.

However, a weakness of the study may be that the sample size was too small to adequately study anger in a normal population where the effect size may be small rather than medium which was expected for this study. Furthermore, the study was based on self reports where responses may be over or understated, subject to response style (acquiescence, deviation, social desirability), and so on. Moreover, the effects of selection bias must be considered, and only people who were comfortable with participating or who were motivated to participate may have participated. Selection bias in future studies may be overcome by advertising widely to ensure a larger sample is obtained when recruiting participants or in the use of online survey methodology that may provide a greater sense of anonymity to respondents.

Future Directions

As indicated previously data has been collected on the dimensions of neuroticism, psychoticism and the impulsiveness, venturesomeness and empathy scales. Research should continue to explore if these dimensions further assist to explain the variance in anger. In addition it is suggested that once all the data collected from this study is analysed that this study is undertaken but with a larger population also drawn from the Australian community. This is suggested to ensure that the potential weakness in the study due to small sample size is tested. Exploration may then also be extended to examine populations drawn from clinical and other populations, where respondents are typified by their anger expression and control. Such research may occur through the use of populations from anger management groups or consolidation of individual case studies where gender and personality has been assessed. As argued earlier these populations may demonstrate emotional and or social dominance characteristics thus allowing exploration of anger and extreme behaviours that may be valuable in furthering the understanding of dysfunctional anger.

The most obvious direction for future study is the exploration of the interaction of biological and socially constructed person variables such as extraversion-introversion and gender role. This study shows that the personality dimension of extraversion-introversion is correlated with outward and inward expression and experience of anger and that gender role is correlated with outward and inward control. Intuitively, one could conclude that these interact to determine of the anger expression, experience and control phenomena. Hence understanding how these two components work together is of importance.

Studies that develop scenarios that use brain imaging technologies could also be explored. In particular, it may be possible to combine behavioural and brain imaging data to further explore whether anger is a biological, socially constructed or an interaction of both given that different brain areas activate for personality and cognitive processing.

Conclusion

In conclusion, the current research examined whether the reported experience, expression and control of anger of a person may be better explained by sex, gender role or by the personality dimension of extraversion-introversion. The results have indicated for this particular sample that anger expression outward and anger expression inward is better accounted for by extraversion-introversion, while anger control outward and inward is better accounted for by gender role. Introversion types were shown to be more affected by the experience of anger than extraverts or of gender types.

The research findings, while small and exploratory, are significant, and are consistent with a relationship between personality based biological and social factors and the separate but interconnected brain systems (limbic and cortex) originally proposed by MacLean (1973). Furthermore, biological sex may be too broad a category to be useful in examining anger. Perhaps more importantly, the present work has highlighted that different factors correlate with different aspects of anger. Confirmation and further identification of

these correlations may be beneficial in gaining a clearer understanding of how anger works. The findings of this study may therefore be valuable in the determining of future research directions and subsequent development of more comprehensive and useful anger constructs and theories.

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Appendix B

Faculty of Computing, Health and Science,

Demographic Information

Sample of Test Instruments:

- STAXI-2
- EPQ-R
- BSRI

Demographic Information

Can you please provide responses to the following questions.

1. What is your year of birth
2. Are you - Female Male
3. Are you - Single Married Partnered Live In Relationship
Partnered Live Independently Relationship
4. Were you born in Australia Yes No
5. If you were not born in Australia What country were you born in
6. Are you an Australian Resident Yes No
7. What is your occupation

State-Trait Anger Expression Inventory (STAXI-2)

The following represents a 10% sample of questions from the Spielberger (1999). State-Trait Anger Expression Inventory.

Part 1 Directions

A number of statements that people use to describe themselves are given below. Read each statement and then blacken the appropriate circle on the Rating Sheet to indicate how you feel *right now*. There are no right or wrong answers. Do not spend too much time on any one statement. Mark the answer that *best* describes your *resent feelings*.

Fill in ① for *Not at all* Fill in ② for *Somewhat* Fill in ③ for *Moderately so* Fill in ④ for *Very much so*

How I Feel Right Now

1. I am furious
2. I feel irritated

Part 2 Directions

Read each of the following statements that people have used to describe themselves, and then blacken the appropriate circle to indicate how you *generally* feel or react. There are no right or wrong answers. Do not spend too much time on any one statement. Mark the answer that *best* describes how you *generally* feel or react.

Fill in ① for *Almost never* Fill in ② for *Sometimes* Fill in ③ for *Often* Fill in ④ for *Almost always*

How I Generally Feel

16. I am quick tempered
17. I have a fiery temper

Part 3 Directions

Everyone feels angry or furious from time to time, but people differ in the ways that they react when they are angry. A number of statements are listed below which people use to describe their reactions when they feel *angry* or *furious*. Read each statement and then blacken the appropriate circle to indicate how *often* you *generally* react or behave in the manner described when you are feeling angry or furious. There are no right or wrong answers. Do not spend too much time on any one statement.

Fill in ① for *Almost never* Fill in ② for *Sometimes* Fill in ③ for *Often* Fill in ④ for *Almost always*

How I Generally React or Behave When Angry or Furious...

26. I control my temper
27. I express my anger

Reference

Spielberger. C.D. (1999). *State-Trait Anger Expression Inventory (STAXI)*, Palo Alto, CA: Psychological Assessment Resources Inc.

EYSENCK Personality Questionnaire – Revised (EPQ-R)

The following represents a 10% sample of 106 questions from the Eysenck Personality Questionnaire Revised (EPQ-R) (Eysenck & Eysenck, 1999).

ADULT EPQ-R	Age	Sex	P	E	N
		M / F	L	A	C

INSTRUCTIONS: Please answer each question by putting a circle around the 'YES' or 'NO' following the question. There are no right or wrong answers, and no trick questions. Work quickly and do not think too long about the exact meaning of the questions.

PLEASE REMEMBER TO ANSWER EACH QUESTION **PAGE 1**

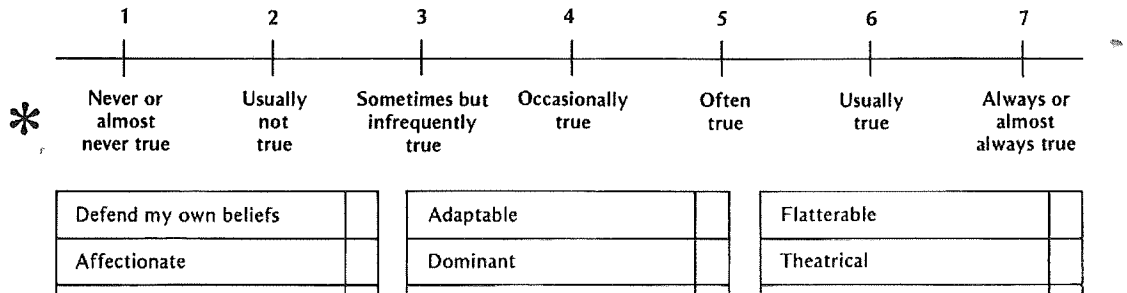
1	Do you have many different hobbies?	YES	NO
2	Do you stop to think things over before doing anything?	YES	NO
3	Does your mood often go up and down?	YES	NO
4	Have you ever taken the praise for something you knew someone else had really done?	YES	NO
5	Do you take much notice of what people think?	YES	NO
6	Are you a talkative person?	YES	NO
7	Would being in debt worry you?	YES	NO
8	Do you ever feel 'just miserable' for no reason?	YES	NO
9	Do you give money to charities?	YES	NO
10	Were you ever greedy by helping yourself to more than your share of anything?	YES	NO

References

Eysenck, H.J., & Eysenck, S.B.G., (1991) Manual of the Eysenck Personality Scales. Hodder & Stoughton. London, United Kingdom

Bem Sex Role Inventory

The following represents a 10% sample of questions from Bem Sex Role Inventory an 60 item questionnaire.



References

Bem, S. L. (1981). Bem Sex Role Inventory. Professional Manual. Palo Alto, CA: Consulting Psychologists Press, Inc.

Appendix C

Faculty of Computing, Health and Science,

(SPSS Output Data)

Data Screening

Bivariate Correlations

Multiple Regression Analysis

Comparison of Mean Scores

DEMOGRAPHIC DESCRIPTIVE STATISTICS

	N	Range	Minimum	Maximum	Sum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Male-Female	110	1	0	1	47	.43	.047	.497	.247
Birth Year	110	57	1932	1989	216301	1966.37	1.275	13.372	178.805
Age	110	57	18	75	4491	40.83	1.283	13.455	181.043
Marital Status	110	3	1	4	236	2.15	.113	1.187	1.410
Biological Sex	110	1	0	1	47	.43	.047	.497	.247
Gender Role	110	3	1	4	296	2.69	.108	1.131	1.280
Extraversion Introversion	110	1	0	1	49	.45	.048	.499	.249
Valid N (listwise)	110								

AGE BY BIOLOGICAL SEX DESCRIPTIVE STATISTICS

Male-Female		N	Minimum	Maximum	Mean	Std. Deviation
Female	Age	63	18	68	41.63	12.694
	Valid N (listwise)	63				
Male	Age	47	18	75	39.74	14.482
	Valid N (listwise)	47				

ASSESSING NORMALITY

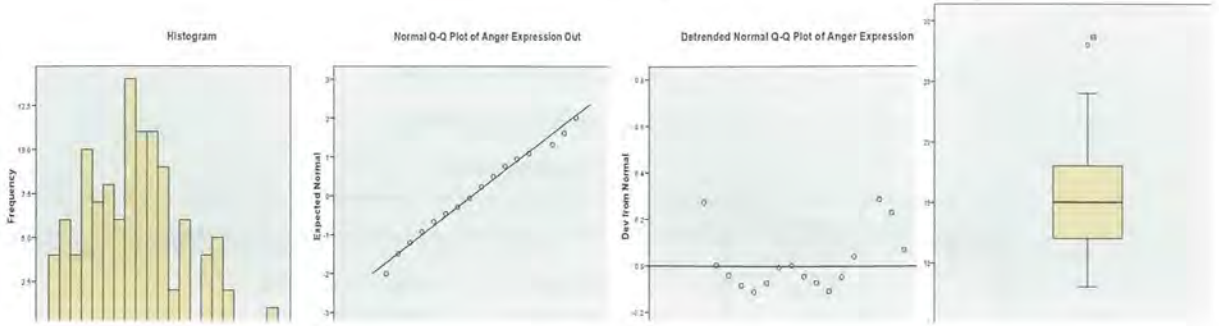
ANGER EXPRESSION OUTWARD

		Statistic	Std. Error
Anger Expression Out	Mean	15.27	.401
	95% Confidence Interval for Mean	Lower Bound	14.48
		Upper Bound	16.07
	5% Trimmed Mean	15.16	
	Median	15.00	
	Variance	17.705	
	Std. Deviation	4.208	
	Minimum	8	
	Maximum	28	
	Range	20	
	Interquartile Range	6	
	Skewness	.396	.230
	Kurtosis	-.122	.457

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Anger Expression Out	.077	110	.114	.973	110	.023

a. Lilliefors Significance Correction



ASSESSING NORMALITY

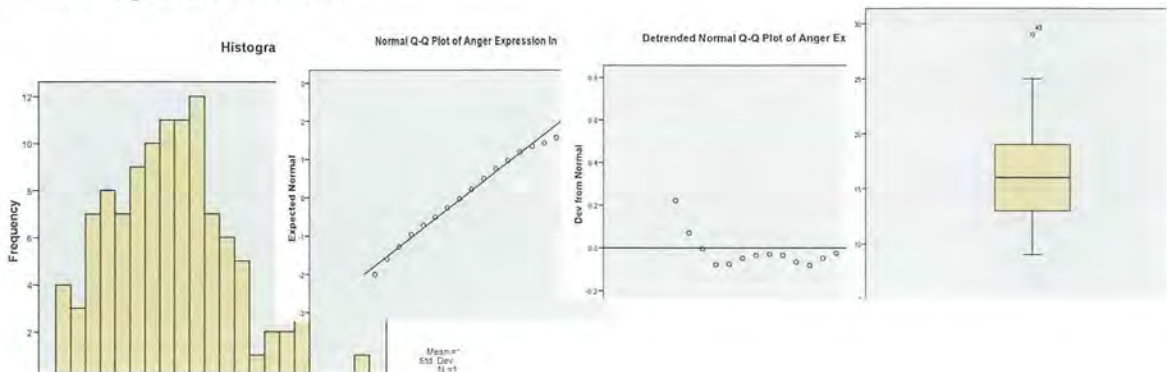
ANGER EXPRESSION INWARD

		Statistic	Std. Error	
Anger Expression In	Mean	16.25	.388	
	95% Confidence Interval for Mean	Lower Bound	15.49	
		Upper Bound	17.02	
	5% Trimmed Mean	16.12		
	Median	16.00		
	Variance	16.577		
	Std. Deviation	4.071		
	Minimum	9		
	Maximum	29		
	Range	20		
	Interquartile Range	6		
	Skewness	.455	.230	
	Kurtosis	.130	.457	

Tests of Normality

	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Anger Expression In	.080	110	.084	.975	110	.037

a. Lilliefors Significance Correction



ASSESSING NORMALITY

ANGER CONTROL OUT

Descriptives

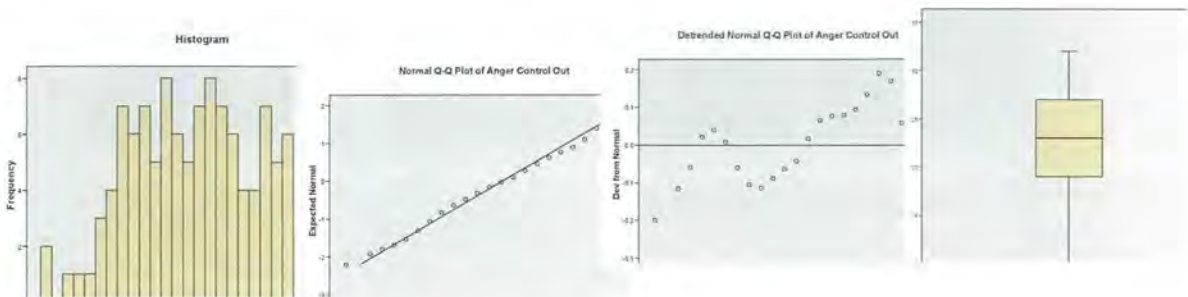
			Statistic	Std. Error
Anger Control Out	Mean		23.09	.518
	95% Confidence Interval for Mean	Lower Bound	22.06	
		Upper Bound	24.12	
	5% Trimmed Mean		23.21	
	Median		23.00	
	Variance		29.496	
	Std. Deviation		5.431	
	Minimum		10	
	Maximum		32	
	Range		22	
	Interquartile Range		8	
	Skewness		-.164	.230
	Kurtosis		-.713	.457

Tests of Normality

	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Anger Control Out	.065	110	.200(*)	.973	110	.024

* This is a lower bound of the true significance.

a. Lilliefors Significance Correction



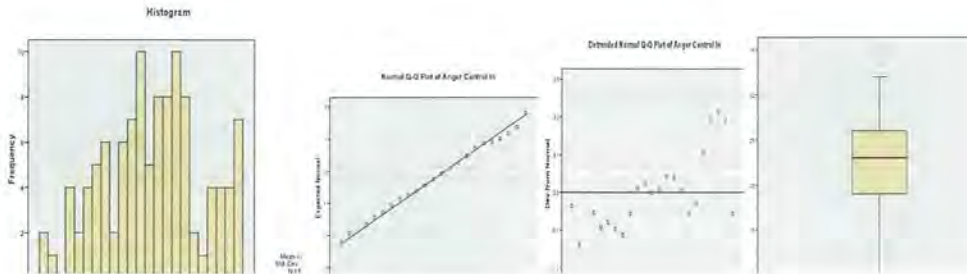
**ASSESSING NORMALITY
ANGER CONTROL INWARD**

			Statistic	Std. Error
Anger Control In	Mean		22.39	.526
	95% Confidence Interval for Mean	Lower Bound	21.35	
		Upper Bound	23.43	
	5% Trimmed Mean		22.46	
	Median		23.00	
	Variance		30.405	
	Std. Deviation		5.514	
	Minimum		10	
	Maximum		32	
	Range		22	
	Interquartile Range		7	
	Skewness		-.085	.230
	Kurtosis		-.582	.457

Tests of Normality

	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Anger Control In	.057	110	.200(*)	.976	110	.048

* This is a lower bound of the true significance.
a. Lilliefors Significance Correction



CORRELATION

BIVARIATE CORRELATION

Correlations(a)

		Anger Expression Out	Anger Expression In	Anger Control Out	Anger Control In	Biological Sex	Gender Role	Extraversion Introversion
Anger Expression Out	Pearson Correlation Sig. (2-tailed)	1	.043	-.482(**)	-.404(**)	-.008	.074	-.285(**)
Anger Expression In	Pearson Correlation Sig. (2-tailed)	.043	1	-.037	.020	-.072	.013	.318(**)
Anger Control Out	Pearson Correlation Sig. (2-tailed)	-.482(**)	-.037	1	.776(**)	.115	-.190(*)	.141
Anger Control In	Pearson Correlation Sig. (2-tailed)	-.404(**)	.020	.776(**)	1	.036	-.233(*)	.123
Biological Sex	Pearson Correlation Sig. (2-tailed)	-.008	-.072	.115	.036	1	.172	.039
Gender Role	Pearson Correlation Sig. (2-tailed)	.074	.013	-.190(*)	-.233(*)	.172	1	.149
Extraversion Introversion	Pearson Correlation Sig. (2-tailed)	-.285(**)	.318(**)	.141	.123	.039	.149	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

a Listwise N=110

REGRESSION

ANGER EXPRESSION OUTWARD

ENTER METHOD

Only the regression that shows significance is reported.

Variables Entered / Removed (b)

Model	Variables Entered	Variables Removed	Method
1	Extraversion Introversion (a)		Enter

a All requested variables entered.

b Dependent Variable: Anger Expression Out

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					Change	F Change	df1	df2	Sig. F Change
1	.285 ^a	.081	.073	4.051	.081	9.580	1	108	.003

a. Predictors: (Constant), Extraversion Introversion

b. Dependent Variable: Anger Expression Out

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	157.231	1	157.231	9.580	.003 ^a
	Residual	1772.587	108	16.413		
	Total	1929.818	109			

a. Predictors: (Constant), Extraversion Introversion

b. Dependent Variable: Anger Expression Out

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	16.344	.519		31.509	.000
	Extraversion Introversion	-2.405	.777	-.285	-3.095	.003

a Dependent Variable: Anger Expression Out

Residuals Statistics(a)

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	13.94	16.34	15.27	1.201	110
Std. Predicted Value	-1.111	.892	.000	1.000	110
Standard Error of Predicted Value	.519	.579	.545	.030	110
Adjusted Predicted Value	13.77	16.48	15.27	1.203	110
Residual	-8.344	11.656	.000	4.033	110
Std. Residual	-2.060	2.877	.000	.995	110
Stud. Residual	-2.077	2.901	.000	1.004	110
Deleted Residual	-8.483	11.850	.000	4.106	110
Stud. Deleted Residual	-2.110	3.007	.001	1.012	110
Mahal. Distance	.796	1.234	.991	.218	110
Cook's Distance	.000	.070	.009	.011	110
Centered Leverage Value	.007	.011	.009	.002	110

a Dependent Variable: Anger Expression Out

REGRESSION

ANGER EXPRESSION INWARD

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	Extraversion Introversion (a)		Enter

a All requested variables entered.

b Dependent Variable: Anger Expression In

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.318 ^a	.101	.093	3.878	.101	12.175	1	108	.001

a. Predictors: (Constant), Extraversion Introversion

b. Dependent Variable: Anger Expression In

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	183.055	1	183.055	12.175	.001(a)
	Residual	1623.818	108	15.035		
	Total	1806.873	109			

a Predictors: (Constant), Extraversion Introversion

b Dependent Variable: Anger Expression In

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	15.098	.496		30.412	.000
	Extraversion	2.596	.744	.318	3.489	.001
	Introversion					

a Dependent Variable: Anger Expression In

Residuals Statistics(a)

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	15.10	17.69	16.25	1.296	110
Std. Predicted Value	-.892	1.111	.000	1.000	110
Standard Error of Predicted Value	.496	.554	.522	.029	110
Adjusted Predicted Value	14.95	17.88	16.25	1.298	110
Residual	-8.694	11.306	.000	3.860	110
Std. Residual	-2.242	2.916	.000	.995	110
Stud. Residual	-2.265	2.946	.000	1.005	110
Deleted Residual	-8.875	11.542	.000	3.932	110
Stud. Deleted Residual	-2.310	3.058	.002	1.014	110
Mahal. Distance	.796	1.234	.991	.218	110
Cook's Distance	.000	.090	.009	.014	110
Centered Leverage Value	.007	.011	.009	.002	110

a Dependent Variable: Anger Expression In

REGRESSION

ANGER CONTROL OUTWARD

Variables Entered / Removed (b)

Model	Variables Entered	Variables Removed	Method
1	Gender Role(a)		Enter

a All requested variables entered.

b Dependent Variable: Anger Control Out

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.190 ^a	.036	.027	5.357	.036	4.023	1	108	.047

a. Predictors: (Constant), Gender Role

b. Dependent Variable: Anger Control Out

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	115.462	1	115.462	4.023	.047(a)
	Residual	3099.629	108	28.700		
	Total	3215.091	109			

a Predictors: (Constant), Gender Role

b Dependent Variable: Anger Control Out

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	25.539	1.323		19.302	.000
	Gender Role	-.910	.454	-.190	-2.006	.047

a Dependent Variable: Anger Control Out

Residuals Statistics(a)

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	21.90	24.63	23.09	1.029	110
Std. Predicted Value	-1.157	1.495	.000	1.000	110
Standard Error of Predicted Value	.530	.922	.709	.137	110
Adjusted Predicted Value	21.68	24.89	23.09	1.036	110
Residual	-12.810	10.100	.000	5.333	110
Std. Residual	-2.391	1.885	.000	.995	110
Stud. Residual	-2.403	1.906	.000	1.004	110
Deleted Residual	-12.936	10.321	.000	5.427	110
Stud. Deleted Residual	-2.458	1.930	-.001	1.010	110
Mahal. Distance	.075	2.234	.991	.753	110
Cook's Distance	.000	.055	.009	.011	110
Centered Leverage Value	.001	.020	.009	.007	110

a Dependent Variable: Anger Control Out

REGRESSION

ANGER CONTROL INWARD

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	Gender Role(a)		Enter

a All requested variables entered.

b Dependent Variable: Anger Control In

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.233 ^a	.054	.046	5.387	.054	6.224	1	108	.014

a. Predictors: (Constant), Gender Role

b. Dependent Variable: Anger Control In

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	180.575	1	180.575	6.224	.014(a)
	Residual	3133.616	108	29.015		
	Total	3314.191	109			

a Predictors: (Constant), Gender Role

b Dependent Variable: Anger Control In

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	25.453	1.330		19.132	.000
	Gender Role	-1.138	.456	-.233	-2.495	.014

a Dependent Variable: Anger Control In

Residuals Statistics(a)

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	20.90	24.31	22.39	1.287	110
Std. Predicted Value	-1.157	1.495	.000	1.000	110
Standard Error of Predicted Value	.533	.927	.713	.138	110
Adjusted Predicted Value	20.66	24.75	22.39	1.293	110
Residual	-14.315	11.099	.000	5.362	110
Std. Residual	-2.658	2.060	.000	.995	110
Stud. Residual	-2.698	2.083	.000	1.005	110
Deleted Residual	-14.751	11.341	.001	5.464	110
Stud. Deleted Residual	-2.781	2.116	.000	1.013	110
Mahal. Distance	.075	2.234	.991	.753	110
Cook's Distance	.000	.111	.010	.015	110
Centered Leverage Value	.001	.020	.009	.007	110

a Dependent Variable: Anger Control In

MEAN COMPARISONS

VARIABLE MEANS

Anger Expression Out Anger Expression In Anger Control Out Anger Control In * Biological Sex

Biological Sex		Anger Expression Out	Anger Expression In	Anger Control Out	Anger Control In
FEMALE	Mean	15.30	16.51	22.56	22.22
	Std. Deviation	3.684	4.518	5.192	5.698
MALE	Mean	15.23	15.91	23.81	22.62
	Std. Deviation	4.864	3.400	5.713	5.310
Total	Mean	15.27	16.25	23.09	22.39
	Std. Deviation	4.208	4.071	5.431	5.514

Anger Expression Out Anger Expression In Anger Control Out Anger Control In * Gender Role

Gender Role		Anger Expression Out	Anger Expression In	Anger Control Out	Anger Control In
Androgenous	Mean	15.47	16.00	24.42	24.26
	Std. Deviation	4.261	4.256	5.048	5.586
Female	Mean	14.37	16.37	24.14	23.43
	Std. Deviation	3.282	3.549	4.791	4.487
Male	Mean	16.06	16.24	21.76	21.18
	Std. Deviation	5.706	3.289	7.005	6.136
Undifferentiated	Mean	15.64	16.28	22.08	21.08
	Std. Deviation	4.202	4.807	5.253	5.778
Total	Mean	15.27	16.25	23.09	22.39
	Std. Deviation	4.208	4.071	5.431	5.514

Anger Expression Out Anger Expression In Anger Control Out Anger Control In * Extraversion Introversion

Extraversion Introversion		Anger Expression Out	Anger Expression In	Anger Control Out	Anger Control In
Extraversion	Mean	16.34	15.10	22.41	21.79
	Std. Deviation	4.423	3.586	5.448	5.475
Introversion	Mean	13.94	17.69	23.94	23.14
	Std. Deviation	3.532	4.214	5.344	5.526
Total	Mean	15.27	16.25	23.09	22.39
	Std. Deviation	4.208	4.071	5.431	5.514

MEAN COMPARISON
USING T-TEST WITH BONFERRONI ADJUSTED ALPHA LEVEL - (.05/8) = .006

Independent Samples Test

		Levene's Test for Equality of Variance		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Anger Expressi	Equal variat assumed	1.669	.199	3.095	108	.003	2.405	.777	.865	3.946
	Equal variat not assume			3.171	107.998	.002	2.405	.758	.902	3.909
Anger Expressi	Equal variat assumed	.720	.398	-3.489	108	.001	-2.596	.744	-4.070	-1.121
	Equal variat not assume			-3.428	94.496	.001	-2.596	.757	-4.099	-1.092

Paired Samples Test

			Paired Differences					t	df	Sig. (2-tailed)
			Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
						Lower	Upper			
Extraversion	Pair 1	Anger Expressi - Anger Expressi	1.246	5.781	.740	-.235	2.727	1.683	60	.098
Introversion	Pair 1	Anger Expressi - Anger Expressi	-3.755	4.309	.616	-4.993	-2.518	-6.101	48	.000

Independent Samples Test

		Levene's Test for Equality of Variance		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Anger Contro	Equal variat assumed	3.731	.062	1.316	34	.197	2.656	2.019	-1.447	6.760
	Equal variat not assumed			1.292	28.796	.207	2.656	2.056	-1.550	6.863

Appendix D

Faculty of Computing, Health and Science,

Guidelines for Contributions by Authors

<http://www.apa.org/journals/emo/submission.html>
20/03.2008



Emotion

Editor: Elizabeth A. Phelps, PhD

ISSN: 1528-3542

Published bi-monthly, beginning in February

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Elizabeth A. Phelps, PhD

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New York University

6 Washington Place

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typed on a separate page. Authors are to make every effort to see that the manuscript itself contains no clues to their identities.

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In addition to addresses and phone numbers, authors should supply electronic mail addresses and fax numbers for use by the editorial office and later by the production office. The majority of correspondence between the editorial office and authors is handled by e-mail, so a valid e-mail address is important to the timely flow of communication during the editorial process.

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Fullagar, C. (1986). A factor analytic study on the validity of a union commitment scale. *Journal of Applied Psychology*, 71, 129–136.

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Mitchell, T. R., & Larson, J. R., Jr. (1987). *People in organizations: An introduction to organizational behavior* (3rd ed.). New York: McGraw-Hill.

Chapter in an Edited Book:

Bjork, R. A. (1989). Retrieval inhibition as an adaptive mechanism in human memory. In H. L. Roediger III & F. I. M. Craik (Eds.), *Varieties of memory & consciousness* (pp. 309–330). Hillsdale, NJ: Erlbaum.

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