"Autonomous Motivation: The Key to Employee Performance and Workplace Success?"

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ABSTRACT

In the face of modern pressures, competition and demands, with change and uncertainty looming over the workplace there is perhaps no better time to uncover an innovative motivational technique. The promotion of autonomy-support offers a promising intervention to enhance high-quality forms of motivation and performance, whilst maintaining employee wellbeing and quality of working life. Based on the Self-Determination Theory, the present research aimed to evaluate the effectiveness of an autonomy-supportive motivational style on intrinsic motivation and performance in a learning task. The study employed an independent measures research design with two experimental conditions that enabled a comparison between 'autonomy-supporting' and 'autonomy-thwarting' motivational techniques. The research was conducted with University Students to ascertain the utility of this motivational tool for the next generation of workers. It was hypothesised that, compared to a condition which incorporated a controlling motivational style, participants in an autonomy-supportive condition would have greater intrinsic motivation (H_1) and display superior performance (H_2). Moreover, it was hypothesised (H_3) that a causal chain would be observed in which autonomy-support affects intrinsic motivation which, in turn, influences performance. All three hypotheses were found to be supported. The results demonstrate consistent differences between the experimental conditions despite the brief nature of the interaction, indicating the profound impact of manipulating the perception of autonomy. Furthermore, they highlight that there is more to motivation than simply its quantity and that an understanding of the *quality* of motivation would be invaluable for various life domains. Finally, this study demonstrates the simplicity with which perceived autonomy can be influenced and presents a novel motivational tool that could enrich employee motivation, enhance performance and drive business success.

Key Words: **Self-Determination Theory • Autonomy-Support • Intrinsic Motivation • Motivational Style • Performance**

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1.   INTRODUCTION

"In today's business environment, competition arises when other organisations seek to do what your company does, only better" (Wagner & Hollenbeck, 2010, p.xviii). Organisations are in continuous competition to uncover the latest strategy for business success, whilst adapting to the unpredictable nature of the modern workplace. The aim is to identify flexible and innovative solutions to maximise business productivity without damaging employee wellbeing and quality of working life (Jones *et al.* 2006). However, globalisation, the economic recession, technological advancements and the '24/7 service culture' are all playing a prominent role in designing a damaging workplace. This is an environment in which employees are working for longer, under increased pressure and demand, facing job insecurity and diminished work-life balance (Kodz *et al.* 2002), which in turn has led to increasing work-stress and stress-related illness (Jones & Bright, 2001). As a result, Organisations are arguably becoming increasingly unaware of their key competitive advantage; their employees. The recognition of employees as a valuable asset calls for identification of the best technique to create an environment in which talent can flourish and through which a competitive advantage can be created and sustained.

1.1.   MOTIVATION AND WORK DESIGN

Motivation varies significantly between individuals and concerns what drives an individual's action, the effort they expend and how long the action is maintained (Arnold *et al.* 2005). It is of considerable importance to organisations to understand motivation in order to enhance both employee functioning and business productivity. High levels of work motivation can emerge from various sources in the workplace, from personal intrinsic interest in one's job to extrinsic pressure from strict deadlines or potential rewards (Van den Broeck *et al.* 2013). Work design relates to the adaptation of the nature or content of job roles which can affect individual and organisational outcomes, such as employee motivation and business productivity (Parker & Wall, 2001). Initially, work design focussed on job simplification (e.g. Taylor, 1911) however, research began to demonstrate that this approach had

psychologically damaging consequences (Dysvik & Kuvaas, 2011). A review of the job redesign literature found that improvements in work performance resulted from increasing extrinsic rewards (Kelly, 1993). However, Kelly also found that improvements in motivation or job satisfaction did not always follow such job redesign, suggesting that simply adapting extrinsic rewards is not necessarily enough. Kelly proposed a Twin-track Model of Job Redesign, highlighting one track that concerns enhancing job satisfaction and motivation and another which specifically influences job performance. The model suggests that job perceptions influence satisfaction and intrinsic motivation, which in turn influences job performance, while direct aspects of job redesign tend to influence job performance and extrinsic motivation. This therefore indicates an approach to job design that improves performance in addition to creating an environment in which motivation and wellbeing can be promoted and maintained. However, in an increasingly competitive market many organisations are instead choosing to implement "quick-fix" methods towards achieving short-term gains in employee productivity and performance (Westover & Taylor, 2010).

Rewards, competition and evaluations are commonly used forms of 'controlling' motivation in organisations (Deci & Ryan, 2012). They follow the nature of the modern work environment by utilising the pressure and competition that is rife in the workplace and are related to employees being extrinsically motivated. The Goal-setting Theory originally postulated by Locke (1968) has had a substantial influence in the workplace and is often used in organisations as a motivational technique that can be externally controlled (Arnold *et al.* 2005). Locke & Latham (1990) provided a review of the goal-setting literature that demonstrates substantial empirical support for certain phenomena outlined by the theory. It confirmed that difficult and specific goals lead to higher performance than general 'do-your-best' goals, feedback is essential for total performance benefits and that these positive outcomes depend partly on the individual's goal commitment. In relation to Kelly's (1993) Twin-track Model, the goal-setting technique could be considered a valuable motivational tool to enhance performance; however it pays little consideration to the other 'track' of employee wellbeing and satisfaction. Moreover, the Goal-setting Theory considers motivation from a quantitative viewpoint, emphasising the amount or intensity of motivation. However, other theories maintain that the quality or type of motivation is

also an important consideration. This distinction between quality and quantity of motivation relates to Kelly's (1993) Model and highlights the difference between methods used as "quick-fixes" to workplace performance (through enhancing motivation quantity) and those that can lead to enduring changes in worker satisfaction and organisational culture (through enhancing motivation quality).

1.2. THE SELF-DETERMINATION THEORY

The Self-Determination Theory (SDT; Deci & Ryan, 1985*a*; Ryan & Deci, 2000) is a prominent example of a theory that emphasises the importance of motivation *quality*, in addition to its quantity. It builds upon the notion that an external or internal locus of causality (deCharms, 1968) is influential in determining motivation. Specifically, SDT proposes that there is a qualitative distinction between types of motivation that are 'autonomous' (internal locus of causality) and types of motivation that are 'controlled' (external locus of causality). Studies have been conducted in multiple domains that emphasise autonomous motivation as being more effective than controlled motivations with respect to various important outcomes, including learning, performing effectively and behaving more healthily (Deci & Ryan, 2012). In relation to the workplace, autonomous motivation has been positively related to increased job satisfaction and engagement (Richer *et al.,* 2002), job performance (Bono & Judge, 2004) and organisational commitment (Lam & Gurland, 2008). Van den Broeck *et al.* (2011) drew on SDT to understand the two main components of workaholism (i.e. working excessively and working compulsively) and how they relate to vigour and exhaustion. They found that autonomous motivation was associated with excessive work, which related positively with vigour, whereas controlled motivation related positively with compulsive work and exhaustion. These findings clearly highlight the importance of considering the quality of motivation, rather than simply the overall quantity, to ensure that motivational techniques are supporting employee wellbeing in addition to promoting performance. As a whole, these studies highlight the potential value of understanding and utilising the underlying concepts of SDT in the workplace.

SDT is based on the proposition that all human beings have fundamental needs to be autonomous, competent and related to others. The theory proposes that

satisfaction of these basic needs leads to autonomous motivation (internal regulation of motivation), psychological wellbeing and healthy development. Conversely, thwarting of the fundamental needs promotes controlled forms of motivation which are externally regulated. Research indicates that social contexts vary to the extent that they support an individual's autonomy or hold control over their behaviour (Deci & Ryan, 2012). Ryan & Deci (2002) suggested that four theories underpin SDT, with this Basic Needs Theory being one of them. The second underlying theory is the Causality Orientation Theory which highlights the role of individual differences in motivational orientation. The causality orientation refers to the degree to which an individual tends to be autonomous, controlled or impersonal (not being intentionally motivated) across various life domains. Therefore, this individual difference in orientation can be influenced by contextual elements of a situation, specifically whether the social environment is interpreted as autonomy-supportive (Baard *et al.,* 2004). The autonomous orientation has been positively associated with self-actualisation, self-esteem, ego development and the tendency to support autonomy in others (Deci & Ryan, 2012). Furthermore, it has been demonstrated that factors in the environment can prime causality orientations (e.g. Friedman *et al.* 2010) and can produce positive outcomes equivalent to those associated with an autonomous causality orientation. These two theories underlying SDT highlight its appreciation of the personally-relevant factors of motivation. In relation to the workplace, they imply the need for organisations to support need satisfaction and promote autonomous causality orientations to enhance employee wellbeing and development.

The two remaining theories underlying SDT relate to performance-orientated aspects of motivation and further highlight the importance of autonomy and autonomous forms of motivation. The Cognitive Evaluation Theory (CET) suggests that social-contextual factors can either enhance intrinsic motivation through promoting feelings of autonomy and competence, or can undermine intrinsic motivation, resulting in an individual being controlled by extrinsic contingencies or amotivated (Gagné & Deci, 2005). The CET therefore proposes a clear distinction between intrinsic and extrinsic motivation and implies that motivation can be enhanced through one form or the other, but not simultaneously through both. In line with this, to explain the relationship between autonomy-support and an individual's subsequent motivation, wellbeing and performance, SDT proposes a motivation mediation model (Jang *et*

al., 2009). This model highlights the distinction made by the CET by proposing that intrinsic motivation, not extrinsic motivation, is a mediator of the relationship between autonomy-support and performance-related outcomes. Kuvaas (2009) found partial evidence, across a broad cross-section of job types, to support the proposition that intrinsic motivation may mediate the relationship between autonomy-support and ultimate work performance. This evidence suggests that promotion of intrinsic motivation is essential to obtain desired performance outcomes.

SDT broadens the concept of intrinsic motivation using a final underlying theory; the Organismic Integration Theory. This theory explains a process through which extrinsically motivated behaviour can become intrinsic to the individual when endorsed by significant others. This is a process of internalisation and, based on the level of internalisation, four types of extrinsic motivation have been identified (Ryan *et al.*, 1985). External regulation is the most controlled form of motivation, followed by introjected regulation which refers to an individual performing a behaviour to avoid negative feelings. The third type is identified regulation which is motivated by the valued outcomes of performing a behaviour. Finally, the most developed form of extrinsically motivated behaviour is integrated motivations, which result from behaviours that are considered to satisfy personal goals that are consistent with an individual's self-identity (Maltby *et al.* 2010). SDT proposes that it is the degree to which the need for autonomy is satisfied that distinguishes whether identification or integration, rather than merely introjection, will occur (Gagné & Deci, 2005). These two developed forms of extrinsically motivated behaviour are classed as autonomous because individuals understand and accept the personal value of the activity (Deci & Ryan, 2012). Autonomous forms of extrinsic motivation are thought to be similar, in the way that they operate, to intrinsically motivated behaviour (Maltby *et al.,* 2010). Therefore, SDT moves away from the intrinsic/extrinsic distinction of motivation, towards distinguishing between autonomous and controlled motivations. Throughout SDT it becomes evident that motivation is not simply a personally regulated state, but conversely various social-contextual factors can substantially influence motivation quality. This is achieved through satisfaction or thwarting of the basic needs, influencing an individual's causality orientation, enhancing or undermining intrinsic motivation or affecting the internalisation process. In relation to the workplace, this theme of SDT, in conjunction with its emphasis on the importance of

autonomy, implies a target for intervention to enhance employee motivation; an autonomy-supportive work environment.

1.3. AUTONOMY-SUPPORT, MOTIVATION AND PERFORMANCE

SDT claims that individuals are naturally inclined to seek contexts that support their basic psychological needs (Sheldon & Grunz, 2009). Therefore, it becomes of considerable importance for organisations to identify aspects of the work environment that can support employees' needs for autonomy, competence and relatedness. Job autonomy is conceptualised as the extent to which a job provides an individual with independence, freedom and discretion to make decisions over the performance of certain roles and tasks (Morgeson & Humphrey, 2006). Therefore, an autonomy-supportive work environment is a context that provides choice, encourages self-initiation and acknowledges a subordinate's perspective (Ryan & Deci, 2000). Autonomy-supportive contexts are clearly associated with the satisfaction of the need for autonomy; however these contexts have also been associated with satisfying the needs for competence and relatedness (Deci & Ryan, 2012), which together improve psychological wellbeing and development. Furthermore, autonomy-supportive environments have been associated with the maintenance or enhancement of intrinsic motivation and in facilitating the internalisation of external contingencies, while controlling contexts have been associated with undermining intrinsic motivation and preventing internalisation (Black & Deci, 2000). In relation to the workplace, an autonomy-supportive environment has been associated with various positive health and organisational outcomes. Specifically, a recent meta-analysis conducted by Humphrey *et al.* (2007) demonstrated the salient role of perceived job autonomy in improving work performance, satisfaction and commitment to the Organisation, in addition to highlighting its negative association with absenteeism, stress and burnout. This evidence indicates the value of providing autonomy-support in the workplace and consequently begs the question of *how* autonomy can be supported. Gagné & Deci (2005) claim that autonomy 'supports' fall into two categories, firstly, specific content of a job, such as choice, can be adapted, and secondly, the general interpersonal ambience can be improved which relates to organisational climate and manager or

leader interpersonal styles. Ryan & Deci (2006) emphasise it is not simply the number of options provided to an individual that stimulates the perception of autonomy, but rather it the nature of the support gained and the overall perception of a culture or context as autonomous. Consequently, to obtain the greatest benefit from an autonomy-supportive work environment, organisations need to consider the organisational climate and specifically focus on enhancing key interpersonal relationships. Therefore, an autonomy-supportive motivational style could be utilised as a valuable technique to enhance interpersonal style and, in turn, have a profound influence on employee motivation, wellbeing and performance.

The self-determination literature emphasises the role of a manger or leader in establishing an organisational climate which promotes need satisfaction and autonomous motivation (Gagné & Deci, 2005). Although many managers understand that the quality of employee motivation is important, they are often unsure how to stimulate employees to promote high-quality motivation (Hardré, 2003). Numerous studies have shown that basic behaviours displayed by a figure of authority can significantly influence subordinates' motivation (Guay *et al.* 2008). However, there is some debate in the literature as to what exactly managers can be taught. Management style is considered to be an innate individual difference that is integrated within the interpersonal behaviours of an individual (Lewis, 2005) and thus is unlikely to be malleable. However, other theorists have argued that management style can be taught and particularly certain features of a management style can be shaped (Brody, 2008). In line with this, specific management skills and strategies are generally considered to be malleable (Kouzes & Posner, 2002). Motivating style is a subset of managerial style that encompasses the way in which a manager attempts to motivate employees (Bono & Judge, 2003). If motivational style can be shaped to become more autonomy-supportive this could have vast benefits in an organisation. It has been found that employees with an autonomy-supportive manager, compared to a controlling manager, display a range of positive work-related outcomes, including effort and engagement, job performance, skill development and long-term retention (Gagné *et al.,* 2000). Moreover, it has been demonstrated that the autonomy-supportive behaviour of an authority figure can increase high-quality autonomous motivation and subsequent use of an autonomy-supportive style in subordinates (Black & Deci, 2000). This finding suggests that the adoption of an

autonomy-supportive managerial motivational style could have a substantial cascading effect in establishing an autonomous organisational culture. The continued promotion of this organisational culture could have endless positive benefits for an organisation in terms of workplace success and employee wellbeing, in addition to being an important factor in the attraction and retention of employees (Bakker *et al.*, 2011).

The initiation and ultimate use of autonomy-support as a strategy for motivational and organisational culture change requires the possibility that managers can be trained in adopting an autonomy-supportive motivational style. A study conducted by Hardré & Reeve (2009) assessed this possibility in a manager training intervention. They found that following training, managers displayed a significantly greater autonomy-supportive motivational style and consequently, their employees showed significantly enhanced autonomous motivation and workplace engagement. This study is one of few intervention-focused studies which aimed to develop a manager's ability to adopt an autonomy-supportive style, and suggests that motivational style can be adapted. However, when evaluating their study Hardré & Reeve reported that the employee-related outcomes may have been a result of the managers becoming less controlling rather than succeeding in becoming more autonomy-supportive. This maintains that motivational style can be malleable but supports the view that learning to become autonomy-supportive may be multi-layered. Reeve (2009) proposed that there were three stages to accomplish a full transition into an autonomy-supportive style; becoming less controlling, wanting to support autonomy and learning how to support it. The Hardré & Reeve study found four general behaviours that demonstrate how an individual can become less controlling, which is the first stage to becoming autonomy-supportive. The second stage of 'wanting to support autonomy' could be facilitated by providing evidence that directly compares the benefits of autonomy-support against the costs of being controlling. Finally, it is possible that more specific autonomy 'supports' may be necessary for an individual to learn how to support autonomy effectively, in order to ensure a full transition to an autonomy-supportive motivational style.

Modern Organisations are increasingly reliant on rapid and skilful innovation at all levels of the business (Arnold *et al.*, 2005), placing new pressures and expectations on young workers joining the workforce. However, early work experiences have been proposed to significantly shape employees' subsequent work-related attitudes, values and behaviours (Loughlin & Barling, 2001). Therefore, it is extremely important for wellbeing and career development, that young employees are supported. Moreover, as the workplace provides an extremely different context to University life and school classrooms, young workers may require additional constructive forms of support that will ensure the retention of motivation and successful performance. It has been found that trainees learn and perform best when they are autonomously engaged (Kozlowski *et al.*, 2010) and when they have access to autonomy-supportive mentors and autonomy-supportive organisational climates (Bell & Kozlowski, 2002). Furthermore, evidence has shown that positive forms of workplace initiative (Grant *et al.*, 2011) and creativity (Hon, 2012) ensue when employees are autonomously motivated, both of which are desired characteristics of young employees entering the workforce (Bindl & Parker, 2009). As a whole, this evidence suggests that autonomy-supportive management and organisational climates would be beneficial to an organisation in regard to work quality and productivity by enhancing valuable work-related outcomes in young workers. However, generally there is limited research exploring the effects of autonomy-supportive interventions on University-aged students, with the vast majority of them being conducted with younger children in a teaching or coaching context (McLachlan & Hagger, 2010). An understanding of the effectiveness of this motivational technique on the next generation of workers would be of considerable importance to organisations that are looking for new strategies to stimulate their young employees.

1.4. OVERVIEW, RATIONALE AND HYPOTHESES

Intrinsic motivation has become increasingly necessary for life success, particularly in relation to higher education and the workplace (Pulfrey *et al.*, 2013). It is considered a high-quality form of motivation that is associated with individuals being more persistent and self-driven (Deci & Ryan, 2000), more active in response to

autonomy-support and more successful in achieving goals (Gagné & Deci, 2005). This suggests that identifying methods that can promote and enhance intrinsic motivation could be invaluable in various life domains. Self-Determination Theory proposes that through facilitating the satisfaction of basic psychological needs, social contexts can impact the quality of an individual's motivation. The promotion of autonomy-support in specific social contexts offers a promising intervention to enhance intrinsic motivation through need satisfaction. However, few studies have attempted to experimentally manipulate the perception of autonomy (Pavey & Sparks, 2012). Nevertheless, based on previous research, it is reasonable to suggest that through modifying an instructors' motivational style to become more autonomy-supportive, it could lead to satisfaction of fundamental psychological needs, facilitation of autonomous motivation and promotion of effective performance. Furthermore, according to the motivation mediation model (Jang *et al.*, 2009) it is possible that these advantageous personal and performance outcomes may be mediated by an individual's stimulated level of intrinsic motivation.

This study aimed to assess the impact of instructor autonomy-supportive motivational style on performance outcomes of University Students. These participants represent an understudied population in relation to this form of motivational intervention and are a population that are of relevance to employers. To build upon Hardré & Reeve's (2009) autonomy-supportive manager training intervention, this study incorporated more specific autonomy-supportive behaviours and a second 'autonomy-thwarting' experimental condition. This allowed a comparison of the effects of a controlling versus autonomy-supportive figure on motivation and performance, in addition to an assessment of the value of specific autonomy-supportive behaviours. Moreover, it appears that, of the few intervention-based studies conducted, research has generally been conducted over long timescales, for example in a series of sport training sessions or classroom lessons (McLachlan & Hagger, 2010). This study is assessing the capacity of autonomy-support to influence intrinsic motivation and subsequent performance within a brief 30 minute learning task. The present research will allow an insight into the utility of autonomy-support as a tool for increasing high-quality motivation and performance in the next generation of workers.

The Study proposed three hypotheses in accordance with the above rationale;

HYPOTHESIS 1 (H$_1$): Participants in an autonomy-supportive experimental condition will have higher intrinsic motivation than those in a controlling experimental condition

HYPOTHESIS 2 (H$_2$): Participants in an autonomy-supportive condition will perform better than those in a controlling condition

HYPOTHESIS 3 (H$_3$): A causal chain will be observed in which autonomy-support affects intrinsic motivation which, in turn, affects performance

2. METHOD

2.1. PARTICIPANTS

The participant sample (N=70) was comprised of female (n=63) and male (n=7) Undergraduate Psychology Students. Participants ranged in age from 18 to 25 years (M=19.31, SD=1.136). Students voluntarily signed up to the Study with the incentive of receiving participation credits. Participants were alternatively assigned to one of two experimental conditions in which they completed a comprehension task and a questionnaire. Both conditions were completed within 45 minutes.

2.2. ETHICS

This research met the current British Psychological Society ethical standards. Ethical approval was granted by the Ethics committee of the Institute of Psychological Sciences, Leeds University (see Appendix 19.). Participants were made aware of the voluntary nature of their participation and their right to withdraw at any time and without giving a reason. All participants completed a consent form (see Appendix 14.), confirming they had understood the ethical principles underlying the research. All participants were fully debriefed. Data collected was recorded anonymously.

2.3. MEASURES

Performance. Performance was assessed using a Multiple-Choice Test, which involved 10 questions (with options A-D). These questions were based on the 438-word passage (obtained StudyMyEnglish, 2007-2008) that had previously been read by participants. See Appendices 7-10. for the full Comprehension Task.

Intrinsic Motivation. The Intrinsic Motivation Inventory (IMI) (Ryan, 1982) was used as a multidimensional measurement tool to assess participants' subjective experience of the task. McAuley *et al.* (1989) found strong support for the validity of the IMI. It consists of 27 items to assess intrinsic motivation; however, shorter versions have been confirmed to be reliable (McAuley *et al.*, 1989). This study used a 24-item version of the IMI (see Appendix 11.). Participants rated each item on a 6-

point Likert scale (1=strongly disagree, 6=strongly agree). The questionnaire assessed participants' interest/enjoyment, perceived choice, effort, tension, and perceived competence, therefore providing 5 subscale scores:

Enjoyment/Interest. Intrinsic motivation is positively predicted by higher enjoyment/interest following a task. This construct was assessed using 6-items. These items had an alpha reliability of .92. Participants rated statements relating to enjoyment and interest such as "*This activity was fun to do*". See Appendix 11., items labelled EN1-6.

Perceived Choice. Perceived choice is a positive predictor of intrinsic motivation. This construct was assessed using 4 items which included questions such as "*I did this activity because I wanted to*". The alpha reliability for these items was .78. See Appendix 11., items labelled CH1-4.

Effort. Effort is positively related to intrinsic motivation. 4 items were used to assess this construct. Statements such as "*I tried very hard on this activity*" were used. These items had an alpha reliability of .90. See Appendix 11., items labelled EF1-4.

Tension. Intrinsic motivation is negatively predicted by tension. 4 items of tension were used. Participants rated statements such as "*I was anxious while working on this task*". The alpha reliability for these items was .87. See Appendix 11., items labelled T1-4.

Perceived Competence. This construct is a positive predictor of intrinsic motivation. Perceived competence was assessed using 6 items. These items had an alpha reliability of .86. Participants rated statements such as "*After working at this activity for a while, I felt pretty competent*". See Appendix 11., items labelled CO1-6.

Manipulation Check. A measure of perceived autonomy-support (PAS) was obtained to ensure the experimental manipulation (instructor motivational style) was successful. The Learning Climate Questionnaire (LCQ; Williams & Deci, 1996) was used to assess perceptions of autonomy-support. Participants rated statements such as *"I feel that my instructor provided me choices and options".* This questionnaire used a 6-item short-version of the LCQ and PAS was calculated by averaging the

individual item scores. Participants rated on a 7-point Likert scale (1=strongly disagree, 7=strongly agree). A higher score indicated greater PAS. The short version of the LCQ has been found to hold adequate reliability and construct validity when used with University Students (Nunez *et al.,* 2012). In the present study, the alpha reliability for the 6 items was .96. Refer to Appendix 12. for this Questionnaire, items labelled PAS1-6.

2.4. EXPERIMENTAL DESIGN

This study employed an independent measures design with two experimental conditions; 'Autonomy-supportive' (AS) and 'Controlling' (C). The Independent Variable (IV) was Instructor Motivational Style and the key Dependent Measure was Intrinsic Motivation (IM; DV_1), assessed through the questionnaire. Performance was a secondary Dependent Variable (DV_2), assessed through the scores obtained on the multiple-choice test. The IV was manipulated according to Reeve & Jang's (2006) instructional behaviours that are perceived as 'autonomy-supports' or 'autonomy-thwarts' (see Appendix 1.). These instructional behaviours were incorporated into the corresponding condition in this Study. In the AS condition participants were seated closest to the learning materials and provided rationales for each task. The instructor allowed Student's to work in their own way, including how long they worked for, having the choice of reading passage 'style' and how they tackled the task. The instructor provided encouragement and allowed questions before starting the task, was responsive to student-generated questions and communicated perspective-taking statements following the task. In addition to failing to perform any of these instructional behaviours, in the C condition the instructor spent more time than the participant talking, longer holding the learning materials, uttered more firm directives or commands, used words such as 'must' or 'should', and controlled elements of the tasks e.g. the time spent and materials used. Furthermore, the instructor was critical of the participant if they were not compliant with instructions, for example if they requested to finish the comprehension task before the allocated time. Refer to Appendices 5-6. for the full verbal instructions. To ensure the style of motivation was maintained, the written instructions on the task materials were also manipulated according to the condition.

2.5. PROCEDURE

Participants were provided with an information sheet (see Appendix 13.) and consent form which highlighted the ethical nature of the study. The participants were told the study was investigating individual differences in learning styles and memory. The verbal instructions given to participants throughout the study varied according to Condition (see above).

The first part of the study involved a reading task. All participants read the same text on computer use in young children. However, in the AS condition participants chose from two layouts of the passage (See Appendices 7-8.). Paper and pens were provided. In the AS condition these resources were highlighted verbally and in the written instructions as possible aids for learning. In the C condition the availability of these resources was only highlighted through the written instructions. The Pilot Study (N=12) carried out, indicated that 10 minutes was sufficient time for Participants to have confidently read the passage. Participants in the AS condition were given the option to choose to finish before the 10 minutes. During this task the instructor left the room. On completion of the task participants (in both conditions) were asked to sit silently for a few minutes before the next task began. This period of inactivity was to allow time away from the text before a recognition task was completed. Ryan *et al.* (1990) used a similar period of inactivity in their study prior to a recall task and found 4 minutes to be sufficient. The Pilot Study also demonstrated 4 minutes was sufficient. Participants were then given a comprehension task, consisting of 10 MCQs based on the passage. The Pilot study found 8 minutes to be optimal time to complete the test. Participants in the AS condition were given the option to finish before the allocated time. The final task was a questionnaire. All participants were provided with an envelope to conceal the completed questionnaire. This measure was intended to reduce social desirability and self-reporting bias. The instructor also left the room whilst the questionnaire was being completed. All participants were given a debrief sheet (see Appendix 15.) and verbally debriefed.

In addition to influencing timing, the Pilot Study highlighted errors in the written content of the questionnaire which were corrected. It also led to the incorporation of a space for additional comments and two demographic questions into the questionnaire (see Appendix 12.).

2.6. METHOD OF ANALYSIS

A manipulation check was performed using a One-Way ANOVA to assess PAS in each condition. Descriptive statistics and One-way ANOVAs were conducted to compare the difference in the dependent measures (DV_1: Intrinsic Motivation, DV_2: Performance) between the two experimental conditions. Inferential analysis was also performed to assess the subcomponents of the IMI. The effect size and power of both DVs were calculated. To explore the data further, correlational analysis was performed to ascertain the relationships between PAS and both DVs, in addition to assessing the correlational relationship between the two DVs. Regression was performed to evaluate the ability of PAS to predict IM (DV_1), and the ability of IM to predict Performance (DV_2). Finally, mediational analysis was used in an attempt to uncover sequences of causality between the Condition, PAS, IM and Performance.

3. RESULTS

This section will present statistical analysis of the experimental data. The criterion for statistical significance was set at the alpha level .05. The data has been screened to check statistical assumptions and found them to be satisfied.

3.1. MANIPULATION CHECK

Descriptive statistics for the 'Perceived Autonomy-Support' (PAS) manipulation check demonstrated higher levels of PAS in the AS condition (M=6.63, SD=.386), than in the C condition (M=2.92, SD=1.30). Inferential analysis showed this difference was statistically significant ($F_{(1,69)}$=263, p<.001), gaining significance at the alpha level .001.

3.2. DESCRIPTIVE STATISTICS

Descriptive statistics obtained for both conditions are presented in Table 1 (see below). This table presents the Means and Standards Deviations for Intrinsic Motivation (IM; DV_1) and Performance (DV_2). It also presents the same descriptive statistics for each subcomponent of the IM construct.

Table 1. *Descriptive Statistics of the Dependent Measures*

	Autonomy Support (AS)		Controlling (C)	
	Mean (M)	Standard Dev. (SD)	Mean (M)	Standard Dev. (SD)
Intrinsic Motivation				
	4.07	.392	3.27	.550
Enjoyment/Interest	4.16	.601	2.46	.979
Choice	5.02	.625	3.67	1.14
Effort	4.51	.849	3.79	1.06
Tension	2.29	.881	2.79	1.33
Competence	4.25	.555	3.78	.767
Performance	83.7	11.4	75.7	16.3

Note. All figures are rounded to 3 s.f.

IM was found to be higher in the AS condition than in the C condition. Comparisons between the conditions found higher mean values of each subcomponent of IM for

the AS condition compared to the C condition, except for the subcomponent Tension. Performance was found to be greater in the AS condition than in the C condition. The standard deviations indicate greater variability of all mean values in condition C.

3.3. INFERENTIAL ANALYSIS

Inferential analysis was conducted to examine the effect of instructor motivational style (IV) on IM (DV_1) and Performance (DV_2). One-way ANOVAs made comparisons between the two experimental conditions.

Inferential analysis assessing overall IM found the effect of condition to be statistically significant ($F_{(1,69)}=49.5$, $p<.001$), with the AS condition showing higher IM. One-way ANOVAs carried out to assess each subcomponent of IM found statistically significant effects, at the alpha level .001, for two of the subcomponents; Enjoyment/Interest ($F_{(1,69)}=76.3$, $p<.001$), Choice ($F_{(1,69)}=38.0$, $p<.001$). Effort ($F_{(1,69)}=10.1$, $p<.01$) and Competence ($F_{(1,69)}=8.69$, $p<.01$) gained significance at the alpha level .01. The fifth subcomponent, Tension, was found to be statistically insignificant ($F_{(1,69)}=3.54$, $p>.05$).

A One-way ANOVA conducted to compare Performance between the two conditions was found to be statistically significant ($F_{(1,69)}=5.65$, $p<.05$).

3.4. EFFECT SIZE AND POWER

Post-inferential analysis was carried out separately for each dependent variable (see Appendices 2-3.). Cohen's (1992) standard conventions were used to interpret effect size and a value of .8 was set as the criterion for a good level of power. Post-inferential analysis of IM (DV_1) found a large effect size for the difference between the two conditions, $d=1.55$. Power calculations for DV_1 were found to be significant at the alpha level .01 indicating a 99% probability of detecting a real effect, $\delta=6.48$. A medium effect size was obtained for Performance (DV_2), $d=0.57$. The power calculations obtained for DV_2 found a 67% probability of detecting a real effect at the alpha level .05, $\delta=2.38$.

3.5.   CORRELATIONAL ANALYSIS

To explore the data further, three correlational analyses were conducted to assess the relations between PAS, DV_1 and DV_2, when the data was collapsed across conditions.

Figure 1. Scatterplot depicting the relationship between Perceived Autonomy-Support (PAS) and Intrinsic Motivation (IM)
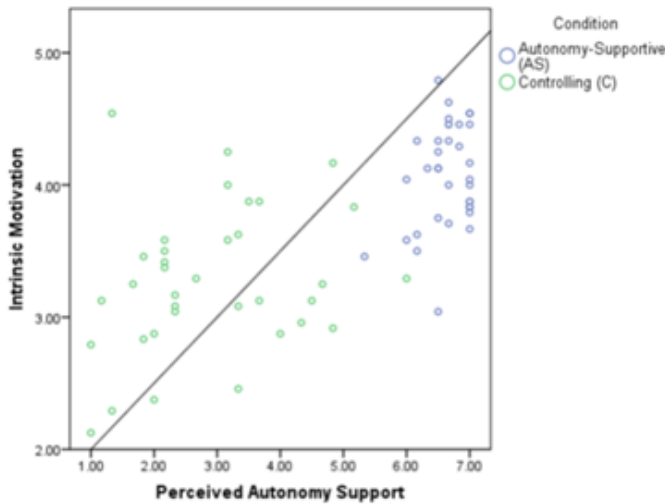
A correlation for the relation between PAS and DV_1 revealed that PAS and IM were significantly related (r=+.665, n=70, p<.01, two tails). Therefore, the correlation between PAS and DV_1 shows a large effect size. The strong nature of this correlation is illustrated by a scatterplot (see Figure 1., left).

A correlation carried out demonstrated that PAS and Performance were not significantly related (r=.190, n=70, p>.05, two tails) (see Appendix 4. for a scatterplot illustrating this relationship).

However, a correlation for the relation between DV_1 and DV_2 revealed that IM and Performance were significantly related (r=.333, n=70, p<.01, two tails). Therefore, the correlation between DV_1 and DV_2 demonstrates a medium effect size. Figure 2. (see right) demonstrates the nature of this correlation in a scatterplot.
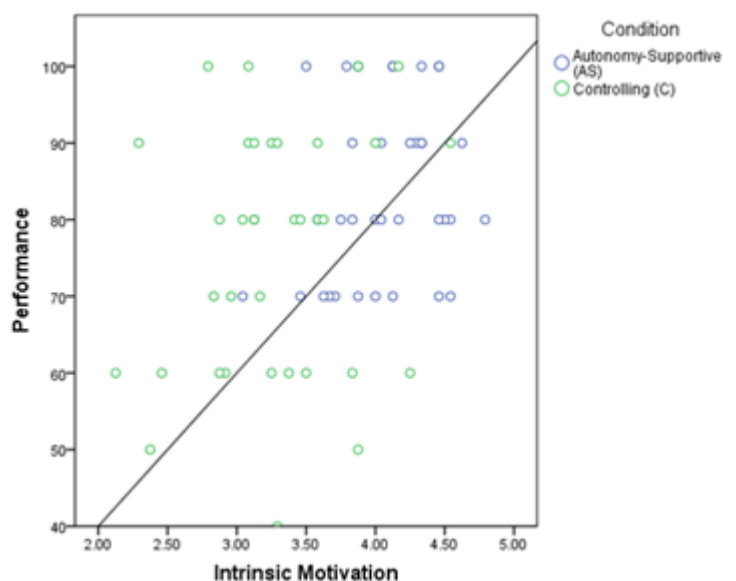
Figure 2. Scatterplot depicting the relationship between Intrinsic Motivation (IM) and Performance

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3.6.   REGRESSION

The amount of variance in DV_1 explained by PAS and the subsequent effect of DV_1 on the variance found in DV_2 was examined using two simple regressions.

The first regression found PAS accounted for considerable variance in DV_1; R^2=.443. This suggests that PAS accounts for 43.3% of the variance in IM. The second regression conducted found IM accounted for 11.1% (R^2=.111) of the variance in Performance (DV_2).

3.7.   MEDIATIONAL ANALYSIS

Three mediational analyses were conducted:

[1] The relationship between Condition (IV) and IM (DV_1) was found to be mediated by PAS. As Figure 3. (below) illustrates, the standardized regression coefficient between the Condition and IM decreased substantially when controlling for PAS. The other conditions necessary for a mediation, according to Baron & Kenny (1986), were also met: Condition was a significant predictor of IM and of PAS, and PAS was a significant predictor of IM.

** p<.001
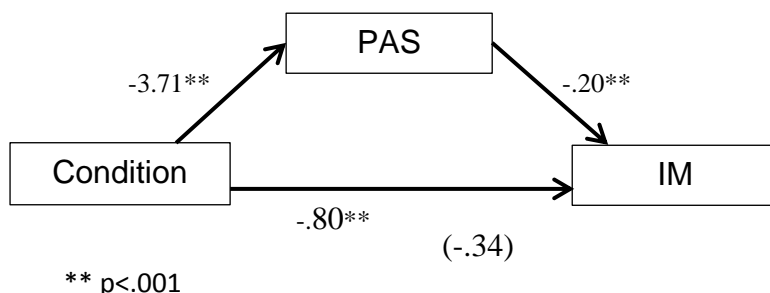
Figure 3. Standardized regression coefficients between
Condition and Intrinsic Motivation (IM) as mediated by
Perceived Autonomy-support (PAS)

[2] Although the conditions of mediation were met for a relationship between Condition and Performance (DV_2) as mediated by IM (DV_1), the computed standardized regression coefficients found a null mediation.

[3] Regression analysis shows PAS is not significantly related to performance, thus not meeting the preconditions set by Baron & Kenny (1986) for a mediation.

However, Mackinnon *et al.* (2007) suggested this precondition is not necessary. Thus continuing the mediational analysis the relationship between PAS and Performance was found to be mediated by IM. This is highlighted by the decrease in standardized regression coefficient between PAS and DV_2 when controlling for IM (see Figure 4., below).

IM

.20**   7.77*

PAS   Performance

1.32   (-.40)
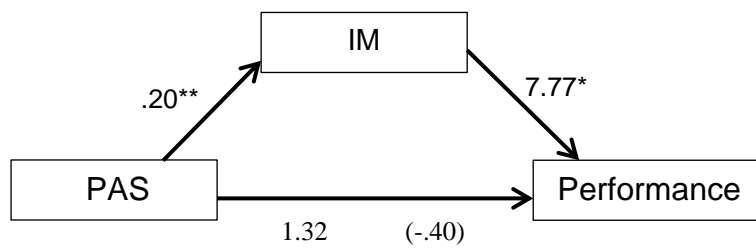
*p<.01 ** p<.001

Figure 4. Standardized regression coefficients between Perceived Autonomy-support (PAS) and Performance as mediated by Intrinsic Motivation (IM)

4. DISCUSSION

The Self-Determination Theory (Deci & Ryan, 1985*a*; Ryan & Deci, 2000) has led to a wealth of research into the benefits associated with an autonomy-supportive social context. Numerous studies have identified its ability to facilitate the satisfaction of fundamental psychological needs, promote psychological wellbeing, enhance autonomous motivation and lead to more effective performance in various life domains. This Study aimed to assess the impact of an autonomy-supportive motivational style, in contrast to a controlling style, on intrinsic motivation and subsequent performance of University Students. Specifically, it assessed the influence of an instructor's motivational style in a brief 30 minute learning task. It was hypothesised that, compared to a condition which incorporated a controlling motivational style, Participants in an autonomy-supportive condition would have greater intrinsic motivation (H_1) and display superior performance (H_2). Moreover, it was hypothesised (H_3) that a causal chain would be observed in which autonomy-support affects intrinsic motivation which, in turn, influences performance.

4.1 CURRENT FINDINGS

The manipulation check demonstrates that across the two conditions Participants' perception of autonomy-support provided by the instructor varied significantly in the expected pattern. This implies that the incorporation of Reeve & Jang's (2006) 'autonomy-supports' and 'autonomy-thwarts' into the autonomy-supportive and controlling conditions, respectively, influenced a considerable difference in the instructor's motivational style.

The descriptive statistics indicated the expected pattern of results, with the autonomy-supportive condition demonstrating higher Intrinsic Motivation (IM) and Performance than the controlling condition. Inferential analysis confirmed these results and provided support for Hypotheses 1 and 2. The analysis revealed that between the two conditions there was a significant difference in IM and Performance, with the finding being stronger for IM than for Performance. In combination with the descriptive statistics, these results therefore support the expectation that IM would be higher in the autonomy-supportive condition, in contrast to the controlling

condition (H_1) and that Performance would follow the same pattern (H_2). The strength of the results relating to IM are perhaps more impressive when the analysis of each subcomponent of the construct is considered. In particular, the difference between the conditions in overall IM was highly significant despite the finding that the subcomponent of 'Tension' was insignificant. This insignificance may relate to the nature of the task, in that pressure was not induced in either condition as there was no expected consequence for task performance. These results imply that the difference in the instructor's motivational style between the two experimental conditions may have caused the distinct pattern of IM and Performance observed in each condition. This therefore demonstrates the vast difference in motivation and performance that can arise as a result of an individual experiencing autonomy or feeling controlled.

Post-inferential analysis was conducted for both outcome variables. An extremely large effect size was obtained for IM, indicating that the instructor's motivational style (IV) had a strong and reliable effect on IM and thus suggesting an important and meaningful relationship between them. The power calculation for this relationship is extremely strong, demonstrating that there is a 99% chance of detecting a real effect. The effect size obtained for Performance was of medium strength, indicating there is also a meaningful relationship between the IV and Performance. However, the power calculation indicates there is only a 68% chance of finding a statistically significant difference when there is one. Together this analysis begins to highlight the difference in the strength of the relationship between the experimental manipulation and its influence on IM and Performance.

To analyse the data further, the self-report measure of Perceived Autonomy-Support (PAS) was used. PAS provides important information as to how the instructor's motivational style affected the individual, particularly as an individual's perception of support may differ from the support the instructor assumes they are providing (Eisenberger *et al.,* 2002). Correlational analysis indicated that PAS was significantly related to IM but was not significantly related to Performance. However, there was a significant correlational relationship between IM and Performance. These findings indicate that there may be a causal chain of effect with the instructor's autonomy-supportive motivational style influencing IM through PAS, and in turn IM influencing Performance. This finding supports Hypothesis 3. A regression found that PAS

accounted for 43.3% of the variance in IM, suggesting PAS can vastly impact high-quality forms of motivation. IM was found to account for only 11.1% of the variance in Performance. Whilst this finding implies a definite role for IM in learning performance, it also suggests that other factors may be influential in the relationship.

Mediation analysis attempted to uncover a causal chain within the results to explain *how* the experimental manipulation influenced the outcome variables. PAS was found to mediate the relationship between the experimental condition and IM. This indicates that an individual's perception of autonomy is heavily influential in translating autonomy-support into increases in IM. Although IM was not found to mediate the relationship between the experimental manipulation and performance, it was found to be a mediator between PAS and Performance. As a whole, these results appear to support Hypothesis 3 by indicating a causal chain in which the experimental condition, through PAS, influenced IM, which in turn influenced performance in the learning task. This finding is consistent with the motivation mediation model (Jang *et al.,* 2009), which proposes that the relationship between autonomy-support and performance is mediated by IM.

4.2.   IMPLICATIONS AND PRACTICAL APPLICATIONS

The present Study supports previous literature which has highlighted the applicability of SDT to enhancing motivation and performance. It emphasises the profound influence that an individual's social context can have through facilitating autonomous forms of motivation. Specifically, it was found that through experimentally manipulating feelings of autonomy, intrinsic motivation can be enhanced which subsequently facilitated performance. Furthermore, the study highlights the simplicity with which perceived autonomy can be influenced and, in turn, has demonstrated that enhancing high-quality forms of motivation is not necessarily a complicated and effortful endeavour. As a whole, it proposes the necessity for figures of authority in various life domains to understand the distinction between controlling and autonomy-supportive motivational styles.

The present research explicitly demonstrated the positive impact autonomy-support can have on learning and performance in University Students, whom have been

identified as an understudied population in relation to this research area (McLachlan & Hagger, 2010). This finding reinforces the universality of SDT and identifies the value of autonomy-support as a motivational technique for University Students. It highlights a tool for educational purposes in relation to learning, reinforcing previous research that has demonstrated its use for children in an educational context (Black & Deci, 2000; Jang *et al.,* 2012). However, it also presents an important consideration for Graduate Employers and perhaps, more generally, any organisation that employs young workers new to the workforce. The utility of an innovative motivational technique is particularly important in the modern pressurised work environment to support the transition of young workers from the educational context into the workplace. Previous research has indicated that interventions designed to engage motivational processes, such as goal-setting, may impede task learning when the task is complex and novel (Earley *et al.,* 1989). This study has demonstrated the utility of an autonomy-supportive motivational technique that enhances motivation whilst retaining, or possibly even improving learning abilities. Moreover, it has been suggested that early work experience can significantly influence workers' subsequent work-related attitudes, values and behaviours (Loughlin & Barling, 2001). Recent research conducted by Jacobs *et al.* (2011) found that autonomous motives predict self-efficacy, positive attitudes and intentions. They suggested that these outcomes and perceptions of competence are motivationally adaptive and are likely to be related to behavioural intentions in the future. This evidence implies that through facilitating autonomous motivation, in addition to enhancing short-term learning and performance outcomes, an autonomy-supportive motivational style could be conducive to positive long-term outcomes in relation to employee development.

This study has revealed the profound influence an instructor's motivational style can have within a brief and simple interaction. This is of relevance to various real-life domains in which, for example, extensive contact with a manager, teacher or coach may not be possible but can still have a lasting motivational influence. In addition, this finding is also of importance for managers in the modern workplace that are striving to identify a 'quick-fix' to employee motivation and productivity. It suggests an alternative motivational tool in place of potentially damaging controlling forms of motivation, such as rewards and goal-setting. It is important to highlight that research

has generally found autonomous motivation to facilitate effective performance if the task is complex or heuristic and requires deep information processing, creativity and cognitive flexibility (Zhang *et al.*, 2011). However, this study has demonstrated its influence on a simple and perhaps relatively mundane task. This influence on performance was related to a difference in intrinsic motivation, which implied that the effect of autonomy-support on performance may have been mediated by intrinsic motivation, in line with a motivation mediation model (Jang *et al.*, 2009). However, although a significant relationship between intrinsic motivation and performance was found, it was not extremely strong. Koestner & Losier (2002) provide a potential explanation for this finding. They proposed that while intrinsic motivation yields better performance on interesting tasks, autonomous-extrinsic motivation yields better performance on tasks that are not necessarily interesting but are important and effort-driven. If this proposal is correct, it implies that the positive performance outcomes gained in this study, may have resulted through promotion of autonomous-extrinsic motivation over and above that promoted through intrinsic motivation. Furthermore, it implies that promotion of autonomous motivation, which consists of both intrinsic and autonomous-extrinsic motivation, would be extremely valuable in various life domains that involve both complex tasks that are interesting and less complex tasks that require effort-driven discipline (Gagné & Deci, 2005).

The utility of providing autonomy-support as a motivational tool is reinforced by this study through its indication of the ease with which an individual could become more autonomy-supportive. It implies that simple components of an interaction can be adapted to become 'autonomy-supports' which can create an autonomy-supportive motivational style. The results suggest it was the specific 'autonomy-supports' that were incorporated into the instructor's motivational style, for example providing rationales, choice and encouragement, that appeared to positively influence intrinsic motivation and performance in the learning task. Conversely, it was demonstrated through the use of 'autonomy-thwarts' that a controlling motivational style has an opposing, diminishing effect on intrinsic motivation and performance. Consequently, this study arguably holds elements that could aid each of the three stages that Reeve (2009) suggested are involved in a process of becoming more autonomy-supportive. These three stages are; becoming less controlling, wanting to support autonomy and learning how to support it. Firstly, through incorporating a 'controlling

condition' and using 'autonomy-thwarts' this study has emphasised specific behaviours to avoid in order to become less controlling. Secondly, through directly comparing the motivational and performance outcomes generated from an autonomy-supportive condition against a controlling condition, this study offers an extremely clear rationale for supporting autonomy. Finally, this study identified specific behaviours that appeared to have a large effect on the perception of autonomy-support. These behaviours may have influenced the instructor's motivational style directly by making it more autonomy-supportive, rather than simply less controlling, as was found in Hardré & Reeve's (2009) intervention study. This suggests the potential utility of these specific 'autonomy-supports' to complete the full transition to becoming autonomy-supportive.

Although undertaken within a learning instructor-based context, this study has great applicability to the workplace. It specifically emphasises the potential for using a manager's motivational style as a tool for promoting high-quality forms of motivation. The adoption of autonomy-support within manager-employee interactions could have a lasting impact on a range of positive workplace outcomes, relating to employee productivity, wellbeing and satisfaction (Baard *et al.,* 2004). There is some debate within the literature as to whether management style is malleable. Though this study does not provide direct evidence that management style can be permanently modified, it does imply that certain strategies or skills can be adopted that can shape a motivational style to become more autonomy-supportive. Whether this will eventually lead to an adaptation in a manager's motivational style is certainly an avenue for further study. However, the importance of targeting interventions at high managerial levels becomes clear on consideration of the influence a manger can have throughout an organisation. Williams & Deci (1996) found that facilitating autonomous motivation through autonomy-support can influence an individual's subsequent use of an autonomy-supportive style and Moreau & Mageau (2012) found that colleague autonomy-support can be influential in various work-related outcomes. Consequently, starting a chain of autonomy-support at managerial levels could lead to the production of an autonomy-supportive culture that runs throughout an organisation.

An autonomy-supportive organisational culture would clearly have many advantages. One potential advantage is the ability of this climate to offset the negative outcomes

associated with using "quick-fix" controlling forms of motivation, particularly through making them less likely to undermine intrinsic motivation (Gagne & Deci, 2005). It is possible that an autonomy-supportive environment would provide an individual with discretion in deciding how and when to perform the task and would allow controlling motivational techniques to provide meaningful information regarding self-competence (Ryan *et al.* 1983). Fang & Gerhart (2012) support this finding through demonstrating that perceived competence and autonomy mediated the relationship between pay-for-performance plans and intrinsic motivation. This is of significance because it is suggested that the workplace requires both extrinsic and intrinsic forms of motivation (Ratelle *et al.*, 2007). It suggests that the promotion of an autonomy-supportive work environment could positively enhance intrinsic motivation whilst preventing the damaging effects of controlling factors. Furthermore, the positive motivational impact associated with extrinsic forms of motivation could be retained (e.g. greater quantity of work; Jenkins *et al.,* 1998). Finally, evidence has shown that autonomy-supportive environments can promote employee autonomous goal-setting which results in greater goal attainment, and in turn enhanced wellbeing and setting of more autonomous goals (Sheldon & Houser-Marko, 2001). These findings indicate that developing an autonomy-supportive environment could lead to new forms of self-motivation, in addition to enhancing conventional motivational techniques.

The workplace is a specific context in which the positive implications of autonomy-support are undeniable. An autonomy-supportive environment promotes high-quality motivation, enhances performance, facilitates wellbeing and provides an environment prepared to develop the next generation of workers. The evidence documented supports the practical application of training autonomy-supportive motivational techniques. However, as emphasised the use of this motivational strategy does not necessarily negate the use of conventional practices but highlights that changing the quality of employee motivation can lead to improved work-related outcomes. In addition to enhancing performance outcomes and productivity, the provision of autonomy-support has been associated with enhancing employee psychological wellbeing (Moreau & Mageau, 2012), preventing the perception of job insecurity (Elst *et al.*, 2012) and promoting acceptance of organisational change (Gagné *et al.,* 2000). In the face of modern pressures and demands, with change

and uncertainty looming over the workplace there is perhaps no better time to promote a new autonomy-supportive motivational technique.

4.3. METHODOLOGICAL CONSIDERATIONS

The participants recruited for this study were University Students and predominantly female. Although research with this population has been highlighted as important in relation to new workers joining the workforce, its direct applicability to the workplace is limited through the nature of the task and use of an unknown instructor rather than a known manager or supervisor. Furthermore, the use of predominantly female participants may influence the interpretation and generalisability of these results. Baard *et al.* (2004) found a consistent pattern of gender differences in the workplace, with women generally perceiving their managers as less autonomy-supportive. In a related vein, Tripathi (2011) highlights the need to consider cultural differences in relation to need for autonomy-support when applying motivational strategies. Moreover, they found this cultural variability was not obtained when using self-report measures. In relation to this study, this finding cautions the sensitivity of the self-report measurements that assessed motivation and perceived autonomy-support. However, the use of an envelope to conceal participants' questionnaires and reduce social desirability may dampen this caution.

Autonomy-supportive environments have been found to enhance both intrinsic motivation and high-quality extrinsic motivation (Gagné & Deci, 2005). These two forms of motivation are classed as 'autonomous', however, this Study has only focused on intrinsic motivation. It is noted that facilitation of internalisation, and thus autonomous-extrinsic motivation, may require structure, limits or contingencies which are not necessary for intrinsic motivation (Boiché *et al.*, 2008). Through providing direct instructions, limited resources to complete tasks and participant credits for completion, this study has actually provided the necessary factors to facilitate internalisation. Therefore, whilst this study has only measured the influence of intrinsic motivation on performance, it is likely that performance has also been enhanced through other forms of autonomous motivation. Thus performance-related outcomes cannot be attributed to intrinsic motivation alone. Moreover, the influence of extrinsic forms of autonomous motivation on performance may have been

especially pronounced for this task. It has been suggested that autonomous-extrinsic motivation is more predictive than intrinsic motivation for behaviours that are effort-driven, relatively uninteresting and require discipline (Koestner & Losier, 2002). Therefore, this limitation emphasises the need for this study to have measured motivation type, and specifically the process of internalisation. Use of a Self-Regulation Questionnaire (Ryan & Connell, 1989) to determine the type of motivation that led to performance would have provided greater explanatory power.

Another limitation of this study is that Causality Orientation was not taken into consideration. Causality orientation is an individual difference factor that refers to the degree to which individual's tend to self-regulate and be autonomous, controlled or impersonally motivated. In various domains, causality orientation has been found to independently predict performance, in addition to that predicted by autonomy-support (Baard *et al.* 2004; Black & Deci, 2000; Ng *et al.*, 2012). It is possible that causality orientation may have affected performance in this study. Failure to include a measure of causality orientation may explain why the performance outcome is relatively unaccounted for by the variables measured. The General Causality Orientation Scale (Deci &Ryan, 1985*b*) could have been used to assess causality orientation in combination with an autonomy-supportive motivational style. Alternatively, Causality Orientation should have been assessed separately to remove its effects in order to solely measure the influence of autonomy-support on motivation and performance. Finally, individual differences in natural ability related to the task should have been considered.

4.4. DIRECTIONS FOR FUTURE RESEARCH

A manager's adoption of an autonomy-supportive motivational style could lead to a cascade of benefits, both for the employer and the employee. However, the utility of this motivational technique depends on the availability of specific training tools that can shape manager behaviour. This study has begun to assess the ability of specific 'autonomy-supports' to influence motivational styles. Whilst this study has demonstrated the positive effects of this approach with University Students in a learning context, future research should ascertain its utility in the work environment with specific tasks that young workers may encounter. Furthermore, the use of these

specific behaviours with all employees at different levels of an organisation should be examined. These proposed avenues for future research represent a necessary shift in focus within this research area from questioning whether autonomy-support is required in a workplace to discovering how to achieve it.

Another avenue for future research is applying this experimental design, or a design applicable to the workplace, that will include an assessment of need satisfaction. This study has utilised the SDT to identify a path through which motivation and performance can be enhanced. However, if the specific autonomy-supports utilised in this study were also found to directly satisfy basic human needs, this motivational technique could be used to enhance both performance and wellbeing. In relation to the workplace, if concrete managerial behaviours could be identified that enhance motivation and simultaneously facilitate performance and wellbeing, an organisation could gain positive recognition for being both successful and employee-focussed. Recently, the importance of satisfying all three psychological needs (i.e. autonomy, relatedness, competence) has been stressed (Sheldon & Niemiec, 2006). Although Deci & Ryan (2012) claimed that an autonomy-supportive environment could support the satisfaction of all three needs, it may be beneficial to incorporate into autonomy-support interventions factors that could specifically promote competence and relatedness. Use of goal-setting, rewards and feedback are frequently used controlling forms of motivation in the workplace. However, as highlighted previously, they could be used positively within an autonomy-supportive environment to facilitate satisfaction of the competence need. The need for relatedness could be satisfied by incorporating means to create a positive leader-member exchange between managers and their employees. Graves & Luciano (2013) have demonstrated that a high-quality leader-member exchange facilitates employee self-determination, thus indicating the potential for positive relationships to enhance need satisfaction. Future research to assess the best individual factors that can be incorporated into an SDT-based intervention to satisfy all or specific needs would be invaluable to target interventions to specific organisational or employee requirements.

A variable-centred approach was adopted by this study to understand the direct implications of intrinsic motivation on performance. However, this approach does not account for the possibility that an individual could hold a distinct combination of motivation types and that these motivational profiles may influence different

outcomes (Moran *et al.,* 2012). Therefore, future research should take a 'person-centred' approach to investigate the effect of autonomy-supportive motivational strategies on different motivation 'types' and the subsequent outcomes. Interventions could subsequently use profiling to adapt certain components to become more focused to employees that are within a certain 'cluster'. Moreover, this can facilitate identification of individuals that are most in need of autonomy-support, and then measures can be taken to ensure their support is increased. For example, certain newcomers to an organisation may require more support and may therefore benefit from additional interventions such as autonomy-supportive mentoring (e.g. Janessen *et al.*, 2013). Finally, although it has been suggested that enduring individual differences in causality orientation cannot be changed (Gagné & Deci, 2005), it has been found that 'cluster membership' can change in certain domains. For example, Hayenga & Corpus (2010) found that within an autonomy-supportive academic context 43% of participants changed cluster membership. Future research to establish this finding would be valuable. If supported, it would suggest that further benefits could be obtained from autonomy-support through its ability to encourage development of self-determined profiles, which, in turn, can help to retain the positive effects of an initial intervention.

It is of importance to ascertain whether the impact of specific interventions to enhance autonomy-support can be sustained. It has been noted that the effects of autonomy-support have not been retained over long periods (Jang *et al.,* 2012). Future longitudinal research should be conducted to assess whether the effects of an autonomy-supportive motivational style can be maintained. In addition, it would be interesting to investigate whether a motivational style could have a cascading impact upon employees throughout the organisation resulting in the establishment of an autonomy-supportive organisational culture which can then continue to provide autonomy-support. Alternatively, if the effects of specific person-based interventions are unlikely to be maintained other techniques to sustain organisational autonomy-support should be assessed. For example, Levesque & Pelletier (2003) used a priming technique to elicit either autonomous or controlled motivational orientations. They found that participants primed with autonomy displayed higher intrinsic motivation, interest, perceived choice and performance than those given a 'controlling' prime. Future research should be conducted to identify priming methods

to enhance the perception of autonomy in the workplace, for example through posters or interactive computer programmes. It is possible that priming may retain, or even enhance, the effects of an autonomy-supportive environment in the long-term. Consequently, assessing the benefits of priming in combination with providing autonomy-support is an intriguing area for future research.

4.5. CONCLUSION

This study has emphasised the profound influence the perception of autonomy-support can have upon a student-aged population, through only a short interaction. These findings are of significance to various life domains in which the promotion of high-quality motivation and facilitation of performance is invaluable. In particular, this research demonstrates the utility of an autonomy-supportive motivational style as an innovative technique to enhance performance-related outcomes in the next generation of workers. In the face of rising pressure, competition and demand, modern organisations commonly adopt "quick-fix" motivational strategies that may enhance business productivity but appear to disregard the true value of a key competitive advantage; their employees. An autonomy-supportive motivational style provides a novel strategy that has the potential to facilitate autonomous motivation, enhance employee performance and drive business success.

REFERENCES

Arnold, J., Silvester, J., Patterson, F., Robertson, I., Cooper, C., & Burnes, B. (Eds.) (2005). Approaches to work motivation and job design. In *Work Psychology, Understanding Human Behaviour in the Workplace,* (pp. 306-352). (4th ed.) Harlow, UK: Pearson Education Limited.

Baard, P. P., Deci, E. L., & Ryan, R. M. (2004). Intrinsic Need Satisfaction: A Motivational Basis of Performance and Well-Being in Two Work Settings. *Journal of Applied Social Psychology*, **34**, 2045-2068.

Bakker, A. B., Albrecht, S., & Leiter, M. P. (2011).Work engagement: Further reflections on the state of play. *European Journal of Work and Organizational Psychology*, **20**, 74-88.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology,* **51**, 1173-1182.

Bell, B. S., & Kozlowski, S. W. J. (2002). Adaptive guidance: Enhancing self-regulation, knowledge, and performance in technology-based training. *Personnel Psychology,* **55***,* 267–306.

Black, A. E., & Deci, E. L. (2000). The effects of instructors' autonomy support and students' autonomous motivation on learning organic chemistry: A self-determination theory perspective. *Science Education*, **84**, 740-756.

Bindl, U. K., & Parker, S. K. (2009). Proactive work behavior: Forward-thinking and change-oriented action in organizations. In S. Zedeck (Eds.), *APA handbook of industrial and organizational psychology*. Washington, DC: American Psychological Association.

Boiché, J. C. S., Sarrazin, P. G., Grouzet, F. M. E., Pelletier, L. G., & Chanal, J. P. (2008). Students' Motivational Profiles and Achievement Outcomes in Physical Education: A Self-Determination Perspective. *Journal of Educational Psychology*, **100**, 688–701.

Bono, J. E., & Judge, T. A. (2003). Self-concordance at work: toward understanding the motivational effects of transformational leaders. *Academy of Management Journal,* **46**, 554-571.

Bono, J. E., & Judge, T. A. (2004). Personality and transformational and transactional leadership: A meta-analysis. *Journal of Applied Psychology*, **89**, 901–910.

Brody, R. (2008). *Effectively Managing Human Service Organizations* (3rd ed.). Thousand Oaks, CA: Sage.

Cohen, J. (1992). A power primer. *Psychological Bulletin,* **112**, 155-159.

deCharms, R. (1968). *Personal causation: The internal affective determinants of behavior.* New York: Academic Press.

Deci, E. L., & Ryan, R. M. (1985*a*). *Intrinsic motivation and self-determination in human behavior.* New York: Plenum Press.

Deci, E. L., & Ryan, R. M. (1985*b*). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality,* **19**, 109-134.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, **11**, 227-268.

Deci, E. L., & Ryan, R. M. (2012). Motivation, Personality, and Development Within Embedded Social Contexts: An Overview of Self-Determination Theory. In R.M. Ryan (Eds.), *The Oxford Handbook of Human Motivation* (pp. 85-103). New York: Oxford University Press.

Dysvik, A., & Kuvaas, B. (2011). Intrinsic motivation as a moderator on the relationship between perceived job autonomy and work performance. *European Journal of Work and Organizational Psychology*, **20**, 367-387.

Earley, P. C., Connolly, T., & Ekegren, G. (1989). Goals, strategy development and task performance: Some limits on the efficacy of goal-setting. *Journal of Applied Psychology*, **74**, 24-33.

Eisenberger, R. A., Stinglhamber, F., Vandenberghe, C., Sucharski, I. L., & Rhoades, L. (2002). Perceived supervisor support: Contributions of perceived organizational support and employee retention. *Journal of Applied Psychology*, **87**, 565–573.

Elst, T. V., Van den Broeck, A., De Witte, H., & De Cuyper, N. (2012). The mediating role of frustration of psychological needs in the relationship between job insecurity and work-related well-being. *Work & Stress: An International Journal of Work, Health & Organisations*, **26**, 252-271.

Fang, M., & Gerhart, B. (2012). Does pay for performance diminish intrinsic interest? *The International Journal of Human Resource Management*, **23**, 1176-1196.

Friedman, R., Deci, E. L., Elliot, A. J., Moller, A. C., & Aarts, H. (2010). Motivational synchronicity: Priming motivational orientations with observations of others' behaviors. *Motivation and Emotion*, **34**, 34-38.

Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior,* **26**, 331-362.

Gagné, M., Koestner, R. and Zuckerman, M. (2000). Facilitating acceptance of organizational change: the importance of self-determination. *Journal of Applied Social Psychology,* **30**, 1843-1852.

Grant, A. M., Nurmohamed, S., Ashford, S. J., & Dekas, K. (2011). The performance implications of ambivalent initiative: The interplay of autonomous and controlled motivations. *Organizational Behavior and Human Decision Processes*, **116**, 241-251.

Graves, L. M., & Luciano, M. M. (2013). Self-determination at work: Understanding the role of leader-member exchange. *Motivation & Emotion*, (under review).

Guay, F., Ratelle, C. F., & Chanal, J. (2008). Optimal learning in optimal contexts: The role of self-determination in education. *Canadian Psychology*, **49**, 233–240.

Hardré, P. (2003). Beyond two decades of motivation: a review of the research and practice in human performance technology. *Human Resource Development Review,* **2**, 54–81.

Hardré, P. L., & Reeve, J. (2009). Training corporate managers to adopt a more autonomy-supportive motivating style toward employees: an intervention study. *International Journal of Training and Development*, **13**, 165-184.

Hayenga, A. O., & Corpus, J. H. (2010). Profiles of intrinsic and extrinsic motivations: A person-centered approach to motivation and achievement in middle school. *Motivation and Emotion*, **34**, 371–383.

Hon, A. H. Y. (2012). Shaping Environments Conductive to Creativity: The Role of Intrinsic Motivation. *Cornell Hospitality Quarterly,* **53**, 53-64.

Humphrey, S. E., Nahrgang, J. D., & Morgeson, F. P. (2007). Integrating motivational, social and contextual work design features: A meta-analytic summary and theoretical extension of the work design literature. *Journal of Applied Psychology*, **92**, 1332–1356.

Jacobs, N., Hagger, M. S., Streukens, S., De Bourdeaudhuij, I., & Claes, N. (2011). Testing an integrated model of the theory of planned behaviour and self-determination theory for different energy balance-related behaviours and intervention intensities. *British Journal of Health Psychology*, **16**, 113–134.

Janssen, S., van Vuuren, M., & de Jong, M. D. T. (2013). Identifying support functions in developmental relationships: A self-determination perspective. *Journal of Vocational Behavior*, **82**, 20–29.

Jang, H., Kim, E. J., & Reeve, J. (2012). Longitudinal Test of Self-Determination Theory's Motivation Mediation Model in a Naturally Occurring Classroom Context. *Journal of Educational Psychology*, **104**, 1175–1188.

Jang, H., Reeve, J., Ryan, R. M., & Kim, A. (2009). Can self-determination theory explain what underlies the productive, satisfying learning experiences of collectivistically oriented South Korean adolescents? *Journal of Educational Psychology,* **101***, 644–661.

Jenkins, G. D., Mitra, A., Gupta, N, & Shaw, J. D. (1998). Are financial incentives related to performance? A meta-analytic review of empirical research. *Journal of Applied Psychology*, **83**, 777-787.

Jones, F., & Bright, J. (2001). *Stress: myth, theory, and research*. Harlow, England: Pearson.

Jones, F. A., Burke, R. J., Westman, M. (2006). *Work life Balance: A Psychological Perspective*. New York: Psychology Press.

Kelly, J. E. (1993). Does job redesign theory explain job re-design outcomes? *Human Relations*, **45**, 753-774.

Kodz, J., Harper, H., & Dench, S. (2002). *Work-life balance: Beyond the rhetoric*. Institute for Employment Studies Report 384, London: IES.

Koestner, R., & Losier, G. F. (2002). Distinguishing three ways of being internally motivated: a closer look at introjection, identification, and intrinsic motivation. In E. L. Deci, & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 101–121). Rochester, NY: University of Rochester Press.

Kouzes, J. and Posner, B. (2002). *The Leadership Challenge*. San Francisco, CA: Jossey-Bass.

Kozlowski, S. W. J., Chao, G. T., & Jensen, J. M. (2010). Building an infrastructure for organizational learning: A multilevel approach. In S. W. J. Kozlowski & E. Salas (Eds.), *Learning, training, and development in organizations* (pp. 363–403). New York: Routledge.

Kuvaas, B. (2009). A test of hypotheses derived from self-determination theory among public sector employees. *Employee Relations*, **31**, 39-56.

Lam, C. F., & Gurland, S. T. (2008). Self-determined work motivation predicts job outcomes, but what predicts self-determined work motivation? *Journal of Research in Personality*, **42**, 1109-1115.

Levesque, C., & Pelletier, L. G. (2003). On the investigation of primed and chronic autonomous and heteronomous motivational orientations. *Personality and Social Psychology Bulletin*, **29**, 1570–1584.

Lewis, J.P. (2005). *Project Planning, Scheduling and Control* (4th. ed.). New York: McGraw Hill.

Locke, E. A. (1968). Toward a theory of task motivation and incentives. *Organizational Behavior and Human Performance*, **3**, 157–189.

Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting and task performance.* Englewood Cliffs, NJ: Prentice-Hall.

Loughlin, C., & Barling, J. (2001). Young workers' work values, attitudes and behaviours. Journal of Occupational and Organizational Psychology, **74**, 543-558.

MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation Analysis. *Annual Review of Psychology*, **58**, 593–614.

Maltby, J., Day, L., & Macaskill, A. (2010). Further Ideas and Debates in Personality: Personality and Culture. *Personality, Individual Differences and Intelligence,* (pp. 230-261). (2nd. ed.). Harlow, UK: Pearson Education Limited.

McAuley, E., Duncan, T., & Tammen, V. V. (1989). Psychometric properties of the Intrinsic Motivation Inventory in a competitive sport setting: A confirmatory factor analysis. *Research Quarterly for Exercise and Sport,* **60***,* 48-58.

McLachlan, S., & Hagger, M. S. (2010). Effects of an autonomy-supportive intervention on tutor behaviors in a higher education context. *Teaching and Teacher Education*, **26**, 1204-1210.

Moran, C. M., Diefendorff, J. M., Kim, T., & Liu, Z. (2012). A profile approach to self-determination theory motivations at work. *Journal of Vocational Behavior*, **81**, 354–363.

Moreau, E., & Mageau, G. A. (2012). The importance of perceived autonomy support for the psychological health and work satisfaction of health professionals: Not only supervisors count, colleagues too! *Motivation and Emotion*, **36**, 268-286

Morgeson, F. P., & Humphrey, S. E. (2006). The Work Design Questionnaire (WDQ): Developing and validating a comprehensive measure for assessing job design and the nature of work. *Journal of Applied Psychology*, **91**, 1321–1339.

Ng, J. Y. Y., Ntoumanis, N., Thøgersen-Ntoumani, C., Deci, E. L., Ryan, R. M., Duda, J. L., & Williams, G. C. (2012). Self-Determination Theory Applied to Health Contexts: A Meta-Analysis. *Perspectives on Psychological Science,* **7**, 325-340.

Nunez, J. L., Leon, J., Grijalvo, F., & Martin-Albo, J. (2012). Measuring autonomy support in university students: The Spanish version of the Learning Climate Questionnaire. *The Spanish Journal of Psychology*, **15**, 1466-1472.

Parker, S. K., & Wall, T. D. (2001). Work design: Learning from the past and mapping a new terrain. In N. Anderson, D. S. Ones, H. K. Sinangil, & C. Viswesvaran (Eds.), *Handbook of industrial, work and organizational psychology: Vol. 1, Personnel psychology* (pp. 90–109). London: Sage.

Pavey, L. J., & Sparks, P. (2012). Autonomy and defensiveness: Experimentally increasing adaptive responses to health-risk information via priming and self-affirmation. *Psychology & Health*, **27**, 259-276.

Pulfrey, C., Darnon, C., & Butera, F. (2013). Autonomy and Task Performance: Explaining the Impact of Grades on Intrinsic Motivation. *Journal of Educational Psychology,* **105**, 39–57.

Ratelle, C. F., Guay, F., Vallerand, R. J., Larose, S., & Senécal, C. (2007). Autonomous, controlled, and amotivated types of academic motivation: A person-oriented analysis. *Journal of Educational Psychology*, **99**, 734-746.

Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist,* **44**, 159–75.

Reeve, J. & Jang, H. (2006). What Teachers Say and Do to Support Students' Autonomy During a Learning Activity. *Journal of Educational Psychology*, **98**, 209-218.

Richer, S. F., Blanchard, C., & Vallerand, R. J. (2002). A motivational model of work turnover. *Journal of Applied Social Psychology*, **32**, 2089–2113.

Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology*, **43**, 450-461.

Ryan, R. M., Chandler, C., Connell, J. P., & Deci, E. L. (1985). Internalization and motivation: Some preliminary research and theoretical speculations. In *Paper presented at the annual meeting of the Society for Research in Child Development.* Detroit, MI.

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology,* **57**, 749-761.

Ryan, R. M., Connell, J. P., & Plant, R. W. (1990). Emotions in non-directed text learning. *Learning and Individual Differences*, **2**, 1-17.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development and well-being. *American Psychologist*, **55**, 68–78.

Ryan, R. M., & Deci, E. L. (2002). An overview of self-determination theory. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 3-33). Rochester, NY: University of Rochester Press.

Ryan, R. M., & Deci, E. L. (2006). Self-regulation and the problem of human autonomy: Does psychology need choice, self-determination, and will? *Journal of Personality*, **74**, 1557-1585.

Ryan, R. M., Mims, V., and Koestner, R. (1983). Relation of Reward Contingency and Interpersonal Context to Intrinsic Motivation: A Review and Test Using Cognitive Evaluation Theory. *Journal of Personality and Social Psychology*, **45**, 736–750.

Sheldon, K. M., & Grunz, A. (2009). Psychological needs as basic motives, not just experiential requirements. *Journal of Personality,* **77**, 1467-92.

Sheldon, K. M., & Houser-Marko, L. (2001). Self-concordance, goal-attainment, and the pursuit of happiness: Can there be an upward spiral? *Journal of Personality and Social Psychology*, **80**, 152–165.

Sheldon, K. M., & Niemiec, C. P. (2006). It's not just the amount that counts: Balanced need satisfaction also affects well-being. *Journal of Personality and Social Psychology*, **91**, 331–341.

StudyMyEnglish. (2007-2008). Retrieved October 7, 2012, from http://www.studymyenglish.com/teacher_rc.aspx

Taylor, F. W. (1911). Principles of scientific management. New York: Harper.

Tripathi, R. (2011). Autonomy, motivation, and work outcomes: A cultural perspective on self-determination theory [Abstract]. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, **71**, 7784.

Van den Broeck, A., Lens, W., De Whitte, H., & Van Coillie, H. (2013). Unraveling the importance of the quantity and the quality of workers' motivation for well-being: A person-centered perspective. *Journal of Vocational Behavior*, **82**, 69-78.

Van den Broeck, A., Schreurs, B., De Witte, H., Vansteenkiste, M., Germeys, F., & Schaufeli, W. (2011). Understanding Workaholics' Motivations: A Self-Determination Perspective. *Applied Psychology: An International Review*, **60**, 600-621.

Wagner, J. A., & Hollenbeck, J. R. (2010). *Organizational Behavior: Securing Competitive Advantage.* New York: Routledge.

Westover, J. H., & Taylor, J. (2010). International differences in job satisfaction: The effects of public service motivation, rewards and work relations. *International Journal of Productivity and Performance Management*, **59**, 811-828.

Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychosocial values by medical students: A test of self-determination theory. *Journal of Personality and Social Psychology*, **70**, 767–779.

Zhang, J., Liu, G., Shi, W., & Fu, X. (2011). On the relationship between motivating style and elementary students' creative thinking: The mediating role of autonomous motivation. *Acta Psychologica Sinica*, **43**, 1138-1150.

APPENDIX

APPENDIX 1. Reeve & Jang (2006) Instructional Behaviours

Autonomy-Supportive	Controlling
Time Listening	*Time Talking
*Asking what the student wants	*Time holding/monopolizing learning materials
*Time allowing students to work in own way	Exhibiting solutions/answers
Time student talking	Uttering solutions/answers
*Seating arrangements *Whether student allowed to sit closet to learning materials*	*Uttering directives/commands
*Providing rationales	*Making should/ought to statements
*Praise as informational feedback	Asking controlling questions
*Offering encouragement	*Deadline statements
Offering hints	Praise as contingent reward
*Responsive to student-generated questions	*Criticizing the student
*Communicating perspective-taking statements	

*Note. * indicates instructional behaviour was incorporated into this study*

APPENDIX 2. Effect Size Calculations using Cohen's *d*

To calculate effect size for an independent groups research design:

$$d = \frac{\mu_1 - \mu_2}{\sigma'} \qquad \text{where:} \qquad \sigma' = \sqrt{\frac{(\sigma_1{}^2 + \sigma_2{}^2)}{2}}$$

2A. Intrinsic Motivation

μ_1 σ_1

Condition	N	Mean	Std. Deviation
Autonomy-Supportive	35	4.0726	.39235
Controlling	35	3.2690	.55002

σ_2

μ_2

$\sigma' = \sqrt{(.39235^2 + .55002^2) / 2}$

$\sigma' = 0.4777\ldots$

$\sigma' = 0.478$ (to 3 s.f.)

To calculate Cohen's **d** substitute the pooled standard deviation (σ') into the equation:

d = (4.0726 – 3.2690) / 0.478

d = 1.6811…

d = 1.68 ────────→ Large Effect Size

2B. Performance

μ_1 σ_1

Condition	N	Mean	Std. Deviation
Autonomy-Supportive	35	83.71	11.398
Controlling	35	75.71	16.321

σ_2

μ_2

$\sigma' = \sqrt{(11.398^2 + 16.321^2) / 2}$

$\sigma' = 14.0763\ldots$

$\sigma' = 14.1$ (to 3 s.f.)

To calculate Cohen's **d** substitute the pooled standard deviation (σ') into the equation:

d = (83.71 – 75.71) / 14.1

d = 0.56737…

d = 0.56 ────────→ Medium Effect Size

APPENDIX 3. Power Calculations

$$\delta = d\sqrt{\frac{N}{2}}$$

3A. Intrinsic Motivation

δ = 1.68 √ 35/2
δ = 7.0279…
δ = 7.03 (to 3 s.f.)

3B. Performance

δ = 0.56 √ 35/2
δ = 2.3426…
δ = 2.34 (to 3 s.f.)

APPENDIX 4. Scatterplot depicting the relationship between PAS and Performance
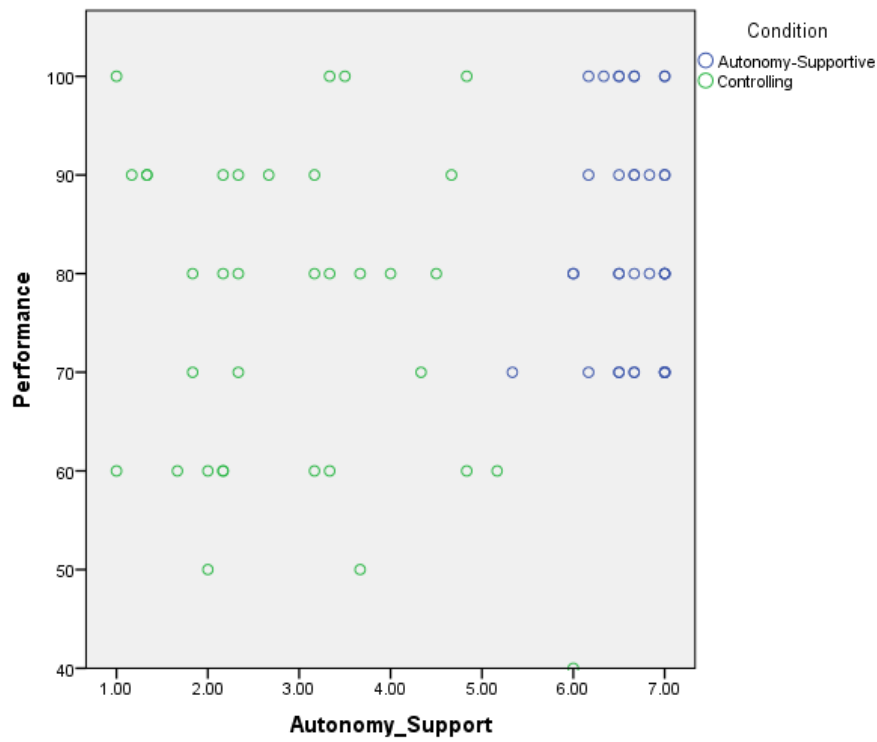
APPENDIX 5. Autonomy-Supportive Verbal Instructions

Participants to sit in the chair with materials in front of them   Passing control to the Participant

"Here is the information sheet about this Study. Please read through it to give you a bit of information about the Study before you start. Take as long as you like to read through it."   Providing Choice

"In order to complete any Study you will be asked to complete a consent form giving your informed consent for completing the Study. The main thing to be aware of is that doing this study is totally up to you – you can withdraw now and not participate or withdraw at any point during after you have completed the study. Please read through the questions carefully and answer the questions on the side. Let me know if you need any help or assistance."   Providing Rationale, Highlighting the ethical principles underlying the Study

"OK just so you are clear – please if, at any point, you do not want to complete the Study any more just let me know."

Task 1:

"The first task is a reading task. This task is looking into the way that you learn and the techniques that you use."   Providing a Rationale

"Which passage would you like?" *Holding out the two copies of the Reading Task*   Providing Choice

It is a passage about computer use in young children. In a moment I will leave the room and let you read through the passage as many times as you want. I will come back in after 10 minutes but please don't feel you have to use all this time if you want to stop reading sooner just call me back in – it is totally up to you!   Providing Choice – How to complete the task and Timeframe needed

I have also left some paper and a pen here – you could use this to make notes/draw pictures/spider diagrams if you wish. You decide how you would like to tackle this task, use whatever technique you think works best for you.   Providing Choice – How to complete the task

You can do it!   Providing Encouragement
Do you have any questions?   Providing time for Questions

Leave the Room, Time 10 minutes

"How did you find that?"
   - "Yes you have a good point"   Responsive and Perspective-taking responses to answers
   - "I know it was a difficult task"

"I am sure you have learnt it well"   Providing Encouragement

"Because we don't want this first task to interfere with what follows if you could set all the materials to one side face down and for the next few minutes simply sit and relax.   Passing control to the Participant

"I'll let you know when we will start the next task." **Time for 4 minutes**

"Right… Are you ready for the next task?"   Hinting the Participant has control

Task 2:

"This next task is a comprehension task. It is composed of 10 questions referring to the passage you have just read. The purpose of this task is to see how your learning style has influenced your memory."   Providing a Rationale

"They are all multiple choice questions and I am sure you will be absolutely fine answering them!"   Providing Encouragement

"You have 8 minutes to answer the questions, but again if you want to finish before this time let me know and you can stop the task. You can just go straight in and start the questions, read them through before answering, leave questions out and return to them. Use whatever approach you feel will work best for you." There is some more paper you could use if you wish"   Providing Choice
"Do you have any questions?"
                   Providing the opportunity for questions
Time for 8 Minutes

"That's Great!" Praise as informational feedback

"How did you find that?" Responsive and Perspective-taking
                              responses to answers

Task 3:

"Finally, if you don't mind the last task is a questionnaire. It isn't too long and you can take as long as you like to complete it." Providing Choice

"I know you have been here a little while but please could you read through the questions carefully and think through your answers. This task simply aims to understand your experience of the Study, there are no trick questions just say how you feel."
                                                   Providing a Rationale
"Remember this is completely anonymous – and all opinions/information you give is completely confidential. Once you have completed your questionnaire please put it into the envelope provided so I will not see your answers."
                           Attempt to prevent social desirability

"That is the end of the Study, thank you very much for your participation"

Provide Debrief

APPENDIX 6. Controlling Verbal Instructions

*Participant instructed to sit, Instructor **hold the materials** until they start*   Indicates the Instructor is in control

You must read through this information sheet carefully and complete this consent form giving your informed consent to complete this Study. Read through the questions on the consent form carefully and mark your answer on the side.

Task 1:
Still holding the materials

"The first task is a reading task."   No rationale given

"In a moment I will leave the room and you must read through a passage. I will return in 10 minutes to stop you reading. By this time you should have finished reading."

   Given a strict deadline

Give them the 'controlling' reading task, leave the room and time 10 minutes   No opportunity for questions given

Time up! *Instructor takes the papers away*   Indicates the Instructor is in control

"Now you must sit quietly for the next few minutes."   No rationale given
Time for 4 minutes

Task 2:
Holding remaining materials in hand   Indicates the Instructor is in control

"The next task you have to complete is a comprehension task."   No rationale given

"It is composed of 10 questions. You have 8 minutes to answer the questions, by this time you should have answered all questions."   Given a strict deadline
   No opportunity for questions given

Stop task after 8 minutes, Instructor takes away the papers

   Indicates the Instructor is in control

Task 3:
"The last task is a questionnaire. You can have up to 15 minutes to complete it."
   No rationale provided   Given a strict deadline
"You should read through the questions carefully and you must be honest with your answers. The Questionnaire is completely anonymous and all opinions/information you give is completely confidential. To ensure this you have to the completed questionnaire into the envelope provided so I will not be able to see your answers."   No opportunity for questions given

Instructor leaves the room, returns once the questionnaire is complete

"That is the end of the Study, thank you very much for your participation"

Provide Debrief

Note. Circled words throughout the instructions indicate controlling commands or directives used

APPENDIX 7. Autonomy-Supportive Condition: Reading Passage Option 1

Task 1: Reading Passage

Please read through the following passage carefully. This exercise is designed to look into the way that you learn and the techniques that you use. Please use the pen and paper provided if you wish. Providing a Rationale
You will have 10 minutes to read, but feel free to call me in at any time before this if you have finished. Happy reading!
  Providing Choice

The role of computers in the development of a young child has been a widely controversial topic for decades, and both parents and educators have put forth both concerns about the potential benefits as well as harms to young children. Critics argue that introducing technology in schools only wastes money and time, and that instead children should be allowed to develop essential learning and social skills through interaction with other students. On the other hand, proponents to the idea suggest that children should take advantage of the newest technologies and that children should learn to become adept at utilizing such technologies as a means to further their success in their eventual entering of the workforce. There are also some concerns that the most modern technologies are not being optimized and utilized in the best way possible.

Both critics and proponents of computers in the classroom agree that the early, formative years of any child are when physical, social-emotional, language, and cognitive skills are acquired. Perhaps the most researched area of development in relation to computer use has been that of cognitive development and the affect that modern technology has on a child's mind. Are computers being used properly to enhance and hasten a child's cognitive development, or are they inhibiting intellectual growth? Can technology support the specific needs of children, or does it take away from essential developmental experiences?

Recent research on brain development has focused on the capabilities of young children, the stages and styles of learning, and social-emotional development. Such research has shown that although children may lack knowledge and experience, they have ample reasoning ability. Given appropriate stimuli, such as close interaction with caring adults and engaging hands-on activities, most children have been shown to dramatically improve their mental developmental skills. A study by the National Research Council found that early learning is assisted by the supportive context of the family and the social environment, through the kinds of activities in which adults engage with children. The influence of the two most renowned learning theories of psychology, Piaget's theory and Vygotsky's constructivism theory, are evident in the most recent research efforts, and it is in considering their models of development that we can make some assessment about the significance of a computer's role in a child's development process. Researchers have attempted to apply the developmental theories of Piaget to children's computer usage. In considering the Piagetian tasks of classifying and categorization, researchers have made several interesting observations about computers and cognitive development. For example, it has been suggested that a child sorting grocery items in the kitchen is a sign of mental development.

APPENDIX 8. Controlling Condition: Reading Passage (AS: Option 2)

Task 1: Reading Passage
Read through the following passage carefully. You have 10 minutes to read the passage. The instructor will return when your time is up. Pens and paper have been provided.

The role of computers in the development of a young child has been a widely controversial topic for decades, and both parents and educators have put forth both concerns about the potential benefits as well as harms to young children. Critics argue that introducing technology in schools only wastes money and time, and that instead children should be allowed to develop essential learning and social skills through interaction with other students. On the other hand, proponents to the idea suggest that children should take advantage of the newest technologies and that children should learn to become adept at utilizing such technologies as a means to further their success in their eventual entering of the workforce. There are also some concerns that the most modern technologies are not being optimized and utilized in the best way possible.

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APPENDIX 9. Autonomy-Supportive Condition: Comprehension Task

Task 2: Comprehension
Please could you now complete the following 10 questions regarding the passage you have just read.

This exercise is looking into how differing learning styles affect an individual's memory. You will have 8 minutes to complete this task, but feel free to let me know if you want to finish early.

Just try your best and I am sure you will do well!

Providing Rationale

Providing Choice

Providing Encouragement

1. **Which of the following best describes the development and organization of the passage?**
   a. The author begins with a concise introduction, followed with a thorough analysis of the shortcomings of using computers in the classroom.
   b. After a broad overview of the argument, the author discusses recent trends in research, followed by a short description of how proponents and advocates of technology in the classroom agree on several key issues.
   c. First the two viewpoints are introduced, followed by an analysis of the similarities of the arguments for and against using technology in the classroom, and finally current research trends are briefly discussed.
   d. The author first selects to advocate the use of computer technology in the classroom, but then, upon a closer inspection of the arguments and research trends, ultimately decides to shun the use of modern technologies in education.

2. **The passage specifically states that critics of introducing technology in schools argue:**
   a. It will not help later in life, e.g. in the workplace
   b. It is a waste of time and money
   c. It could affect a child's social relationships
   d. It could damage a child's brain

3. **"…early, formative years of any child are when physical, social-emotional, language and cognitive skills are acquired." Who agrees with this statement?**
   a. Critics of child computer use
   b. Parents
   c. Proponents of child computer use
   d. Both a and c

4. **What has recent research on brain development been focused on?**
   a. Styles of learning
   b. Capabilities of young children
   c. Stages of learning
   d. All of the above

5. **Research on brain development has shown children have sufficient:**
   a. Reasoning ability
   b. Knowledge
   c. Social Skills
   d. None of the above

6. **A study by the National Research Council found early learning is assisted by:**
a. Supportive families and social environment
b. Use of Computers
c. Healthy lifestyle
d. Both a and b

7. **Piaget and Vygotsky provide two separate theories, but both incorporate a model of:**
   a. Learning
   b. Development
   c. Cognition
   d. None of the above

8. **What two Piagetian tasks are mentioned in the text?**
a. Prioritization and Classification
b. Organisation and Prioritization
c. Categorisation and Classification
d. Categorisation and Counting

9. **The text mentions a study in the last sentence that suggests child sorting grocery items in the kitchen is a sign of:**
a. Mental Development
b. Intellect
c. Social Skills
d. Mathematical Skills

10. **The passage provides information that could be used to answer which of the following questions?**
a. Approximately during which years of a child's life are physical, social, emotional, communication and cognitive skills acquired?
b. Does a young child sorting grocery items provide proof that social and communication skills are lacking?
c. Should computer technologies be introduced to students when they are in their teens?
d. Has research shown that the use of computers helps to enhance a child's cognitive development?

That is the end of the Comprehension Task. Thank you for participating.

Note. Correct answers are highlighted

APPENDIX 10. Controlling Condition: Comprehension Task

Task 2: Comprehension

You now have to complete the following 10 questions. You must answer every question. You have 8 minutes to complete the task, by which time you should have answered all the questions.

1. **Which of the following best describes the development and organization of the passage?**
   a. The author begins with a concise introduction, followed with a thorough analysis of the shortcomings of using computers in the classroom.
   b. After a broad overview of the argument, the author discusses recent trends in research, followed by a short description of how proponents and advocates of technology in the classroom agree on several key issues.
   c. First the two viewpoints are introduced, followed by an analysis of the similarities of the arguments for and against using technology in the classroom, and finally current research trends are briefly discussed.
   d. The author first selects to advocate the use of computer technology in the classroom, but then, upon a closer inspection of the arguments and research trends, ultimately decides to shun the use of modern technologies in education.

2. **The passage specifically states that critics of introducing technology in schools argue:**
   a. It will not help later in life, e.g. in the workplace
   b. It is a waste of time and money
   c. It could affect a child's social relationships
   d. It could damage a child's brain

3. **"…early, formative years of any child are when physical, social-emotional, language and cognitive skills are acquired." Who agrees with this statement?**
   a. Critics of child computer use
   b. Parents
   c. Proponents of child computer use
   d. Both a and c

4. **What has recent research on brain development been focused on?**
   a. Styles of learning
   b. Capabilities of young children
   c. Stages of learning
   d. All of the above

5. **Research on brain development has shown children have sufficient:**
   a. Reasoning ability
   b. Knowledge
   c. Social Skills
   d. None of the above

6. **A study by the National Research Council found early learning is assisted by:**
   a. Supportive families and social environment
   b. Use of Computers
   c. Healthy lifestyle
   d. Both a and b

7. **Piaget and Vygotsky provide two separate theories, but both incorporate a model of:**
   a. Learning
   b. Development
   c. Cognition
   d. None of the above

8. **What two Piagetian tasks are mentioned in the text?**
   a. Prioritization and Classification
   b. Organisation and Prioritization
   c. Categorisation and Classification
   d. Categorisation and Counting

9. **The text mentions a study in the last sentence that suggests child sorting grocery items in the kitchen is a sign of:**
   a. Mental Development
   b. Intellect
   c. Social Skills
   d. Mathematical Skills

10. **The passage provides information that could be used to answer which of the following questions?**
    a. Approximately during which years of a child's life are physical, social, emotional, communication and cognitive skills acquired?
    b. Does a young child sorting grocery items provide proof that social and communication skills are lacking?
    c. Should computer technologies be introduced to students when they are in their teens?
    d. Has research shown that the use of computers helps to enhance a child's cognitive development?

That is the end of the Comprehension Task. Thank you for participating.

Note. Correct answers are equivalent to those in previous comprehension task (Appendix 9.)

APPENDIX 11. Intrinsic Motivation Questionnaire

Same Questionnaire used for both Conditions

Using the scale below, please indicate your agreement or disagreement with each of the following statements by placing a number in the blank space preceding each statement.
Please take your time to think about your answer to each question. All your opinions are confidential.

1	2	3	4	5	6
Strongly disagree					Strongly agree

____ I enjoyed doing this activity. EN1

____ I did this activity because I wanted to. CH1

____ I put a lot of effort into this. EF1

____ I felt under pressure while doing these. T1

____ I think I am pretty good at this activity. CO1

____ I felt like I had to do this activity. CH2 (Reversed Question)

____ I tried very hard on this activity. EF2

____ This activity did <u>not</u> hold my attention at all. EN2 (Reversed Question)

____ I think I did pretty well at this activity, compared to other students. CO2

____ This activity was fun to do. EN3

____ I believe I had some choice about doing this activity. CH3

____ I thought this was a boring activity. EN4 (Reversed Question)

____ I did <u>not</u> feel nervous at all while doing this. T2 (Reversed Question)

____ After working at this activity for a while, I felt pretty competent. CO3

____ I was very relaxed whilst doing this activity. T3

____ I did <u>not</u> put much energy into this. EF3 (Reversed Question)

____ I was pretty skilled at this activity. CO4

____ I would describe this activity as very interesting. EN5

____ I did <u>not</u> try very hard to do well at this activity. EF4 (Reversed Question)

____ This was an activity that I could <u>not</u> do very well. CO5 (Reversed Question)

____ I was anxious while working on this task. T4

____ I am satisfied with my performance at this task. CO4

____ I felt like it was <u>not</u> my own choice to do this task. CH4 (Reversed Question)

____ I thought this activity was quite enjoyable. EN6

APPENDIX 12. Learning Climate Questionnaire (Measure PAS)
Same Questionnaire used for both Conditions

This questionnaire contains items that are related to your experience with your instructor in this study. Please respond to each of the following statements using the scale below.
*Please remember your <u>responses are confidential</u>, and will be <u>collected anonymously</u>. Your responses will be concealed by placing your questionnaire in the envelope provided. The instructor will **not** be able to attribute these answers to you. Please answer all questions truthfully.*

I feel that my instructor provided me choices and options.   PAS1

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

My instructor conveyed confidence in my ability to do well in the activity.   PAS2

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

My instructor encouraged me to ask questions.   PAS3

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

I do <u>not</u> feel very good about the way my instructor talked to me.   PAS4

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

My instructor made sure I really understood the task and what I needed to do.   PAS5

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

My instructor did <u>not</u> give me freedom and choice in the task.   PAS6

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

Any Further comments:

_____

_____

Finally, please indicate your gender and age below.

GENDER (please circle one):   male   female

Demographic Questions

AGE: _____

Thank you for your time. That is the end of the Questionnaire. <u>Please put the Questionnaire in the Envelope provided </u>and then call in the Instructor.

Measure taken to Prevent Social Desirability

APPENDIX 13. Participant Information Sheet

Information Sheet

Researcher: Stephanie Sattin

E-Mail: ps10ss@leeds.ac.uk

Address: Institute of Psychological Sciences
University of Leeds
Leeds, LS2 9JT

Supervisor: Dr. Gina Z. Koutsopoulou, Lecturer, CSci
Occupational Psychologist, Institute of Psychological Sciences, Leeds.

I am a psychology student at the University of Leeds carrying out a Research Project as part of my Level 3 study requirements, under the supervision of Dr Gina Koutsopoulou.

This research is subject to ethical guidelines set out by the British Psychological Society. These guidelines include principles such as obtaining your informed consent before research starts, notifying you of your right to withdraw, and protection of your anonymity. This sheet has been designed to provide you with enough information about the study to allow you to make an informed decision about participation. Please take time to read the following information carefully and if you have any questions or would like to discuss anything with me please let me know.

Aim of the study
This study has been designed to investigate individual differences in learning styles and techniques. The subsequent effects of these individual differences on your memory are both interesting and relevant to current literature in the area.

Study Procedure
The Study will consist of three tasks. The first task will involve reading a passage of information on computer use in young children. The second task requires you to complete a short comprehension exercise. Finally, you will be provided with a short questionnaire to complete.

The Study is expected to last for approximately 30-45 minutes and you will receive 2 Participant Pool Credits for you participation.

Participation in this study is **voluntary**. If you agree to participate in this study, all your responses and your questionnaire will be treated confidentially. **Your name and identifying information (provided on your consent form) will be kept securely and separately from the rest of your experimental materials, including your questionnaire.** If you decide to participate, you are free to withdraw at any time and without giving a reason.

APPENDIX 14. Participant Consent Form

Every Participant was required to complete this form in order to participate in the Study
<u>Consent Form</u>

- Have you been provided sufficient information to understand
  both the purpose and procedure of this study?   YES/NO

- Do you understand what your participation in this study involves?
                                                                         YES/NO

- Have you had the opportunity to ask questions and discuss
  the study?   YES/NO

- If you have asked questions, have the answers given
  been satisfactory?   YES/NO/NA

- Do you understand you are free to withdraw from the research
  at any time?   YES/NO

- Do you understand that you are free to choose not to
  answer a question without giving a reason why?   YES/NO

- Do you agree to take part in this study?   YES/NO

- Do you agree to your responses being used in a statistical
  analysis?   YES/NO

Name (block capitals):
_____

Signed:
_____

Date:
_____

APPENDIX 15. Participant Debrief Sheet

Participant Debrief

The Self-Determination Theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000) proposes that individuals have innate psychological needs for competence, autonomy and relatedness. Based on the postulates of SDT, research has been conducted to assess the benefits of autonomy-support, specifically the benefits of providing autonomy-supportive teaching and coaching. It has been shown that this supportive style increases motivation and engagement, resulting in better performance outcomes.

This Study aims to discover whether an autonomy-supportive motivating style would enhance intrinsic motivation and facilitate performance. All the Participants used within this study are University Students, as this population has been understudied in relation to this area of research. Moreover, much of the current research on autonomy-support is conducted over longer periods of time or in natural contexts, for example a sport training session or a classroom lesson. This Study is assessing whether this motivational technique will affect performance in a discrete experimental task.

There were two conditions in this Study, one in which the instructor was autonomy-supportive and displayed certain behaviours to support the Participant throughout the task, including providing rationales, choice and encouragement. The second condition is a 'controlling' condition in which the Participants were not supported through the task and were simply told what to do and how to do it. It is hypothesised that compared to participants that were in the controlling condition, participants in the autonomy-supportive condition would be more motivated to complete the comprehension task. As a result, it is expected that Participants in the autonomy-supportive condition will demonstrate better task performance. The Questionnaire assessed both level of intrinsic motivation (page 1.) and the perception of autonomy-support provided by the instructor (page 2.), as a manipulation check. Performance was assessed through the Multiple-Choice Test.

This research is important because it will help psychologists to understand the best techniques to motivate performance in Students. It also has wider implications in the workplace, specifically in terms of young workers entering the workforce and how Management can support their needs and motivation. As a potential strategy for enhancing employee motivation and performance generally, this technique would be of great interest to employers dealing with issues, such as employee engagement, as a result of the current economic situation. Finally, this research may provide Employers with a tool to improve both organisational performance and employee wellbeing.

Thank you for participating in this Study.

If you would like more information about this research, please contact:

Stephanie Sattin: ps10ss@leeds.ac.uk.

APPENDIX 16. Raw Data

Note. Data presented in order of presentation within the Report

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	70	18	25	19.31	1.136
Valid N (listwise)	70				

Oneway Manipulation Check

ANOVA

Autonomy_Support

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	240.810	1	240.810	263.063	.000
Within Groups	62.248	68	.915		
Total	303.058	69			

Descriptives Split by Condition (AS or C)

Descriptive Statistics

Condition		N	Mean	Std. Deviation
Autonomy-Supportive	Autonomy_Support	35	6.6286	.38579
	Intrinsic_Motivation	35	4.0726	.39235
	Enjoy	35	4.1571	.60085
	Choice	35	5.0214	.62536
	Effort	35	4.5143	.84875
	Tension	35	2.2857	.88106
	Competence	35	4.2524	.55479
	Performance	35	83.71	11.398
	Valid N (listwise)	35		
Controlling	Autonomy_Support	35	2.9190	1.29691
	Intrinsic_Motivation	35	3.2690	.55002
	Enjoy	35	2.4619	.97860
	Choice	35	3.6714	1.13561
	Effort	35	3.7857	1.05570
	Tension	35	2.7929	1.32909
	Competence	35	3.7810	.76672
	Performance	35	75.71	16.321
	Valid N (listwise)	35		

Oneway

ANOVA

Intrinsic_Motivation

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.300	1	11.300	49.512	.000
Within Groups	15.520	68	.228		
Total	26.820	69			

ANOVA Subcomponents of the IM construct

		Sum of Squares	df	Mean Square	F	Sig.
	Between Groups	50.292	1	50.292	76.277	.000
Enjoy	Within Groups	44.835	68	.659		
	Total	95.127	69			
	Between Groups	31.894	1	31.894	37.954	.000
Choice	Within Groups	57.143	68	.840		
	Total	89.037	69			
	Between Groups	9.289	1	9.289	10.125	.002
Effort	Within Groups	62.386	68	.917		
	Total	71.675	69			
	Between Groups	4.501	1	4.501	3.540	.064
Tension	Within Groups	86.454	68	1.271		
	Total	90.954	69			
	Between Groups	3.889	1	3.889	8.685	.004
Competence	Within Groups	30.452	68	.448		
	Total	34.342	69			

ANOVA

Performance

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1120.000	1	1120.000	5.652	.020
Within Groups	13474.286	68	198.151		
Total	14594.286	69			

Correlations

Note. 'Autonomy-Support' refers to Perceived Autonomy-Support (PAS)

Correlations

		Intrinsic_Motivation	Autonomy_Support
Intrinsic_Motivation	Pearson Correlation	1	.665[**]
	Sig. (2-tailed)		.000
	N	70	70
Autonomy_Support	Pearson Correlation	.665[**]	1
	Sig. (2-tailed)	.000	
	N	70	70

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

Correlations

		Performance	Autonomy_Support
Performance	Pearson Correlation	1	.190
	Sig. (2-tailed)		.116
	N	70	70
Autonomy_Support	Pearson Correlation	.190	1
	Sig. (2-tailed)	.116	
	N	70	70

Correlations

		Performance	Intrinsic_Motivation
Performance	Pearson Correlation	1	.333[**]
	Sig. (2-tailed)		.005
	N	70	70
Intrinsic_Motivation	Pearson Correlation	.333[**]	1
	Sig. (2-tailed)	.005	
	N	70	70

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

Regression 1

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Autonomy_Support[b]	.	Enter

a. Dependent Variable: Intrinsic_Motivation
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.665[a]	.443	.434	.46885

a. Predictors: (Constant), Autonomy_Support

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.872	1	11.872	54.008	.000[b]
	Residual	14.948	68	.220		
	Total	26.820	69			

a. Dependent Variable: Intrinsic_Motivation
b. Predictors: (Constant), Autonomy_Support

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.726	.140		19.436	.000
	Autonomy_Support	.198	.027	.665	7.349	.000

a. Dependent Variable: Intrinsic_Motivation

Regression 2

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Intrinsic_Motivation[b]	.	Enter

a. Dependent Variable: Performance

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.333[a]	.111	.098	13.813

a. Predictors: (Constant), Intrinsic_Motivation

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1619.596	1	1619.596	8.488	.005[b]
	Residual	12974.690	68	190.804		
	Total	14594.286	69			

a. Dependent Variable: Performance
b. Predictors: (Constant), Intrinsic_Motivation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	51.188	9.929		5.155	.000
	Intrinsic_Motivation	7.771	2.667	.333	2.913	.005

a. Dependent Variable: Performance

Mediation 1 (X=Condition, M=PAS, Y=IM)

Regression Assess mediation preconditions

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Condition[b]	.	Enter

a. Dependent Variable: Intrinsic_Motivation
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.649[a]	.421	.413	.47774

a. Predictors: (Constant), Condition

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.300	1	11.300	49.512	.000[b]
	Residual	15.520	68	.228		
	Total	26.820	69			

a. Dependent Variable: Intrinsic_Motivation
b. Predictors: (Constant), Condition

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.876	.181		27.005	.000
	Condition	-.804	.114	-.649	-7.036	.000

a. Dependent Variable: Intrinsic_Motivation

Regression Assess mediation preconditions

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Condition[b]	.	Enter

a. Dependent Variable: Autonomy_Support

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.891[a]	.795	.792	.95677

a. Predictors: (Constant), Condition

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	240.810	1	240.810	263.063	.000[b]
	Residual	62.248	68	.915		
	Total	303.058	69			

a. Dependent Variable: Autonomy_Support

b. Predictors: (Constant), Condition

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.338	.362		28.588	.000
	Condition	-3.710	.229	-.891	-16.219	.000

a. Dependent Variable: Autonomy_Support

Regression Assess mediation preconditions

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Autonomy_Support[b]	.	Enter

a. Dependent Variable: Intrinsic_Motivation

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.665[a]	.443	.434	.46885

a. Predictors: (Constant), Autonomy_Support

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.872	1	11.872	54.008	.000[b]
	Residual	14.948	68	.220		
	Total	26.820	69			

a. Dependent Variable: Intrinsic_Motivation

b. Predictors: (Constant), Autonomy_Support

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.726	.140		19.436	.000
	Autonomy_Support	.198	.027	.665	7.349	.000

a. Dependent Variable: Intrinsic_Motivation

Regression Mediation found

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Condition, Autonomy_Support[b]	.	Enter

a. Dependent Variable: Intrinsic_Motivation
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.677[a]	.458	.442	.46582

a. Predictors: (Constant), Condition, Autonomy_Support

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.282	2	6.141	28.302	.000[b]
	Residual	14.538	67	.217		
	Total	26.820	69			

a. Dependent Variable: Intrinsic_Motivation
b. Predictors: (Constant), Condition, Autonomy_Support

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.578	.635		5.632	.000
	Autonomy_Support	.126	.059	.422	2.127	.037
	Condition	-.338	.246	-.273	-1.374	.174

a. Dependent Variable: Intrinsic_Motivation

Mediation 2 (X=Condition, M=IM, Y=Performance)

Regression Assess mediation preconditions

Model	Variables Entered	Variables Removed	Method
1	Condition[b]	.	Enter

a. Dependent Variable: Performance

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.277[a]	.077	.063	14.077

a. Predictors: (Constant), Condition

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1120.000	1	1120.000	5.652	.020[b]
	Residual	13474.286	68	198.151		
	Total	14594.286	69			

a. Dependent Variable: Performance
b. Predictors: (Constant), Condition

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	91.714	5.320		17.238	.000
	Condition	-8.000	3.365	-.277	-2.377	.020

a. Dependent Variable: Performance

Regression Assess mediation preconditions

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Condition[b]	.	Enter

a. Dependent Variable: Intrinsic_Motivation
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.649[a]	.421	.413	.47774

a. Predictors: (Constant), Condition

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.300	1	11.300	49.512	.000[b]
	Residual	15.520	68	.228		
	Total	26.820	69			

a. Dependent Variable: Intrinsic_Motivation
b. Predictors: (Constant), Condition

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.876	.181		27.005	.000
	Condition	-.804	.114	-.649	-7.036	.000

Regression Assess mediation preconditions

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Intrinsic_Motivation[b]	.	Enter

a. Dependent Variable: Performance

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.333[a]	.111	.098	13.813

a. Predictors: (Constant), Intrinsic_Motivation

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1619.596	1	1619.596	8.488	.005[b]
	Residual	12974.690	68	190.804		
	Total	14594.286	69			

a. Dependent Variable: Performance

b. Predictors: (Constant), Intrinsic_Motivation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	51.188	9.929		5.155	.000
	Intrinsic_Motivation	7.771	2.667	.333	2.913	.005

Regression Null Mediation Found

Model	Variables Entered	Variables Removed	Method
1	Condition, Intrinsic_Motivation[b]	.	Enter

a. Dependent Variable: Performance

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.343[a]	.117	.091	13.866

a. Predictors: (Constant), Condition, Intrinsic_Motivation

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1712.794	2	856.397	4.454	.015[b]
	Residual	12881.492	67	192.261		
	Total	14594.286	69			

a. Dependent Variable: Performance

b. Predictors: (Constant), Condition, Intrinsic_Motivation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	61.578	17.945		3.431	.001
	Intrinsic_Motivation	6.180	3.520	.265	1.756	.084
	Condition	-3.034	4.357	-.105	-.696	.489

a. Dependent Variable: Performance

Mediation 3 (X=PAS, M=IM, Y=Performance)

Regression Assess mediation preconditions (precondition not met)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Autonomy_Support[b]	.	Enter

a. Dependent Variable: Performance
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.190[a]	.036	.022	14.384

a. Predictors: (Constant), Autonomy_Support

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	524.815	1	524.815	2.537	.116[b]
	Residual	14069.471	68	206.904		
	Total	14594.286	69			

a. Dependent Variable: Performance
b. Predictors: (Constant), Autonomy_Support

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	73.432	4.303		17.066	.000
	Autonomy_Support	1.316	.826	.190	1.593	.116

a. Dependent Variable: Performance

Regression Assess mediation preconditions

Model	Variables Entered	Variables Removed	Method
1	Autonomy_Support[b]	.	Enter

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.665[a]	.443	.434	.46885

a. Predictors: (Constant), Autonomy_Support

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.872	1	11.872	54.008	.000[b]
	Residual	14.948	68	.220		
	Total	26.820	69			

a. Dependent Variable: Intrinsic_Motivation
b. Predictors: (Constant), Autonomy_Support

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.726	.140		19.436	.000
	Autonomy_Support	.198	.027	.665	7.349	.000

a. Dependent Variable: Intrinsic_Motivation

Regression Assess mediation preconditions

Model	Variables Entered	Variables Removed	Method
1	Intrinsic_Motivation[b]	.	Enter

a. Dependent Variable: Performance

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.333[a]	.111	.098	13.813

a. Predictors: (Constant), Intrinsic_Motivation

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1619.596	1	1619.596	8.488	.005[b]
	Residual	12974.690	68	190.804		
	Total	14594.286	69			

a. Dependent Variable: Performance
b. Predictors: (Constant), Intrinsic_Motivation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	51.188	9.929		5.155	.000
	Intrinsic_Motivation	7.771	2.667	.333	2.913	.005

a. Dependent Variable: Performance

Regression **Mediation found** following Mackinnon *et al.* (2007)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Autonomy_Support, Intrinsic_Motivation[b]	.	Enter

a. Dependent Variable: Performance
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.336[a]	.113	.086	13.902

a. Predictors: (Constant), Autonomy_Support, Intrinsic_Motivation

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1646.421	2	823.211	4.260	.018[b]
	Residual	12947.864	67	193.252		
	Total	14594.286	69			

a. Dependent Variable: Performance
b. Predictors: (Constant), Autonomy_Support, Intrinsic_Motivation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	49.819	10.647		4.679	.000
	Intrinsic_Motivation	8.662	3.596	.371	2.409	.019
	Autonomy_Support	-.399	1.070	-.057	-.373	.711

a. Dependent Variable: Performance

APPENDIX 17. Conference Poster

Autonomous Motivation: The Key to Employee Performance and Workplace Success?

Stephanie Sattin

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UNIVERSITY OF LEEDS

Introduction

The Self-Determination Theory (Deci & Ryan, 1985) proposes that individuals have innate psychological needs for competence, autonomy and relatedness.

Large research base in the area of autonomy-support. It has been shown that this supportive style increases motivation and engagement, resulting in better performance.

Kuvaas (2009) found a strong relationship between IM and work performance across a broad cross-section of job types.

Gagné and Deci (2005) found that the need for autonomy precedes a range of employee outcomes, including IM and work performance.

Aims and Hypothesis

Aim: Assess the impact of AS manipulation on a Student-aged population in a short 30-minute session.

H1: Participants in an AS Condition will have higher IM

H2: Participants in an AS Condition will have better performance

Method

Participants (N=70) completed a Comprehension Task, 438-word passage and 10 MCQs. 4 Minute period of inactivity

Questionnaire completed using Likert Scales measuring Intrinsic Motivation and perceived Autonomy-Support.

Strongly Disagree—1—2—3—4—5—6—7—Strongly Agree

Experimental manipulation: adaptation of Instructor behaviour between the 2 conditions [Autonomy-Supportive (AS), Controlling (C)]. According to Reeve & Jang's (2006) 'autonomy supports' and 'autonomy thwarts'.

Results

- Participants in the AS Condition demonstrated higher IM $(F_{(1, 69)}=49.5, p<.01)$ Performance $(F_{(1, 69)}=5.65, p<.05)$ and PAS $(F_{(1, 69)}=263, p<.01)$.
- Perceived Autonomy-Support and Intrinsic Motivation (see Figure 1), were significantly related (r=+.665, n=70, p<.01, two tails).
- Perceived Autonomy-Support and Performance are not significantly correlated (r=.190, n=70, p>.05, two tails)
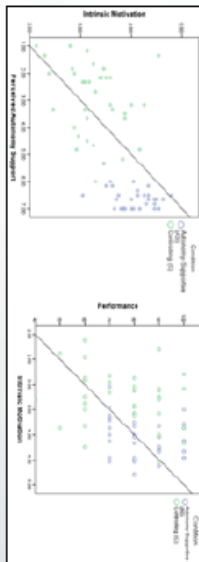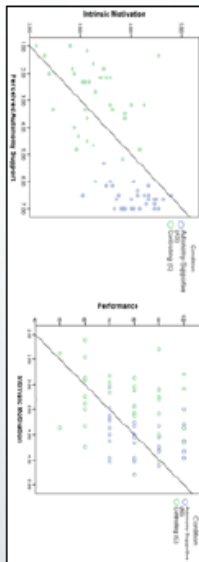- Intrinsic Motivation and Performance (see Figure 2) were significantly related (r=.333, n=70, p<.01, two tails).

Figure 1. (left) Scatterplot perceived AS against IM Figure 2. (right) Scatterplot IM against Performance

Discussion

- Results demonstrated that manipulating instructor behaviour to become more autonomy-supportive significantly increases Student IM and performance. This impact is found despite the interaction being brief.
- Correlational analysis suggests:
  - The higher the perception of autonomy-support, the higher the IM
  - There is no significant relationship between PAS and performance, However;
  - The higher the IM, the higher the performance
- Application to the Workplace: Highlights the need for Managers to adopt AS style, especially relevant to current economic climate to enhance employee wellbeing and satisfaction with Quality of Working Life (Van den Broeck et al. 2013)

References

Deci, E. L. & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behaviour. New York: Plenum Publishing Co.

Gagné, M. & Deci E. L. (2005). Self-determination theory and work motivation. Journal of Organizational Behavior, 26, 331-362.

Kuvaas , B. (2009). A test of hypotheses derived from self-determination theory among public sector employees. Employee Relations, 31, 39-56.

Reeve, J. & Jang, H. (2006). What teachers say and do to support students' Autonomy During a Learning Activity. Journal of Educational Psychology, 98, 209-218.

Van de Broeck, A., Lens, W., De Witte, H., & Van Colle, H. (2013). Unraveling the importance of the quantity and the quality of workers' motivation for well-being: A person-centered perspective. Journal of Vocational Behaviour, 82, 69-78.

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I would like to thank my Supervisor Gina Koutsopoulou for her dedicated support and guidance throughout my dissertation so far.

APPENDIX 18. Supervision Diary

Final Year project - Supervision Diary

Student: Stephanie Sattin   **Supervisor: Gina Koutsopoulou**

Date	Time given	Topics discussed and actions to be taken
27th Sept	1 hour	Discussed completing dissertation in Occ Psychology and target deadlines completion of proposal/ethics form
4th Oct	1 hour	Discussed proposal and how to complete ethics form. Also decided to conduct a Pilot Study
18th Oct	1 hour	Discussed materials produced for the Study and Pilot Study. Decision to begin recruitment for actual results upon completion of the Pilot study.
23rd Jan	45mins	General discussion on progress (just finished data collection) and general advice for write up, specifically method section.
4th Feb	1 hour	Discussion on results and SPSS analysis.
4th March	30mins	Discuss results, progress update and write up
13th March	20mins	Arranged a meeting with Andy Prestwich, discussion on mediation analysis

Student's Signature:

Supervisor's Signature:

APPENDIX 19. Certificate of Ethical Approval

Certificate of ethical approval
#12-0174

Title: Autonomy-Support and University Students: How does it influence Intrinsic Motivation?
Supervisor: Gina Koutsopoulou

Date of approval: 22 October 2012

This certificate confirms that the named project has received approval from the ethics committee. This certificate can be used in student projects. The name of the student will not be listed, but can be requested from the ethics committee.

Ethics committee of the Institute of Psychological Sciences, Leeds University