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On the Role of Specific Emotions in Autonomous and Controlled Motivated Behaviour

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Abstract: In the present study, we study the effect of four specific emotions (i.e. happiness, relaxation, depression, and anxiety) on autonomous and controlled motivated behaviour. Drawing on the componential approach to emotions, we argue that because different emotions have a different action readiness—the readiness to engage with the environment—they also have a different impact on autonomous and controlled motivated behaviour. To test this hypothesis, we performed two studies. In the first one, 50 participants took part in an experience sampling study in which they reported their emotions (happiness, relaxation, depression, and anxiety) and autonomous and controlled motivated behaviour 10 times a day for 7 consecutive days. In the second study, 217 students participated in a lab experiment in which we studied the effect of induced anxiety, depression, happiness, and relaxation on autonomous motivated behaviour. The results showed how specific emotions predict autonomous motivated behaviour and that the relationship between the different emotions and autonomous motivated behaviour depends on the emotion under study. By doing so, we demonstrated the important role of emotions in the elicitation of autonomous motivated behaviour. *Copyright © 2014 European Association of Personality Psychology*

Key words: emotions; autonomous motivated behaviour; antecedent; action readiness

In an attempt to explain the direction of and the reasons for people's behaviour, researchers traditionally focused on the concept of motivation. Motivation is 'a psychological state that modulates behavior', with this modulation occurring in several ways (Ernst, Pine, & Hardin, 2006, p. 21). First, motivation determines which stimuli one prefers (e.g. which tasks at work the person prefers doing). Second, it plays a role when selecting an action related to these stimuli (e.g. select a way to perform the chosen work task). Third, motivation affects the execution of the selected action. In the present study, we focus on motivated behaviour or the reason why people behave in a particular way. Because of the key importance of motivation in the emergence of motivated behaviour, throughout the years, many motivation theories emerged, with most of them focusing on one particular driver of motivated behaviour. For example, incentive theory stressed the importance of rewards (Katzell & Thompson, 1990), goal setting theory emphasized the achievement of goals (Locke & Latham, 1994), need theories stressed the satisfaction of basic needs (Alderfer, 1969; Maslow, 1943), and equity theory was concerned with the comparison of one's own input/output ratio against the ratio of others (Adams, 1965).

Although these motivation theories clearly diverge in that they focus on different drivers of motivated behaviour, they also share common ground because they assume that motivated behaviour results from a cognitive evaluation the person makes about his or her environment. In the emotion domain, these cognitive evaluations are referred to as appraisals, and these appraisals are of key importance in the elicitation of motivated behaviour as 'a differentiated appraisal of the situation with respect to the needs, goals, and values of the individual is made in order to activate a differentiated adaptive response' (Fontaine & Scherer, 2013; p. 171). These adaptive responses are called action tendencies, which are related to the experience of a specific emotion. As a result, emotion theories hypothesize a direct link between specific emotions and motivated behaviour, an idea that underscores the adaptive function of emotions (i.e. preparing the organism for adaptive behaviour in specific situations). However, despite its theoretical centrality, 'the preparation of behavior has only received scant empirical attention' (Fontaine & Scherer, 2013; p. 171). Moreover, the few studies that have examined this either focused on general activation (e.g. approach–avoidance) or on very specific action tendencies (see Frijda, 1987). With the present paper, we will contribute to the literature on emotion and motivation by studying the effect of four specific emotions (i.e. happiness, relaxation, depression, and anxiety) on two well-known types of motivated behaviour (i.e. autonomous and controlled motivated behaviour). To do so, we draw on the componential approach to emotions, according to which an action readiness—the readiness to engage with the environment—is one of the defining features of an emotion (Frijda, Kuipers, & ter Schure, 1989). Building on the action readiness components of happiness, relaxation, depression, and anxiety, we argue that the effect of these four specific emotions on motivated behaviour can be different for autonomous and controlled motivated behaviour. Moreover, because the

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different specific emotions have different action readiness profiles, we hypothesize that they predict autonomous and controlled motivated behaviour in a different way. In what follows, we first discuss the differences between autonomous and controlled motivated behaviour; subsequently, we discuss the componential view on emotions and the relevance of the action readiness component, and finally, we discuss how happiness, relaxation, depression, and anxiety are hypothesized to predict autonomous and controlled motivated behaviour.

Autonomous versus controlled motivated behaviour

To distinguish autonomous from controlled motivated behaviour, we start from Self-Determination Theory (SDT; Deci & Ryan, 1985). SDT is a meta-theory on motivated behaviour that integrates several of the more traditional motivation theories. This theory has been studied intensively, and it is supported by several empirical studies (e.g. Hagger, Chatzisarantis, & Harris, 2006; Haivas, Hofmans, & Pepermans, 2013; Hofer & Busch, 2011; Patrick, Knee, Canevello, & Lonsbary, 2007; Radel, Sarrazin, Legrain, & Wild, 2010; Vansteenkiste et al., 2007).

According to SDT, 'motivation concerns energy, direction, persistence and equifinality—all aspects of activation and intention' (Ryan & Deci, 2000, p. 69). Central to this theory is the distinction between two types of motivated behaviour: autonomous and controlled motivated behaviour. Autonomous motivated behaviour refers to behaviour that is performed with a sense of volition because it is in line with the individual's own interests and values (e.g. doing something because you find the activity inherently interesting), whereas controlled motivated behaviour pertains to behaviour that is carried out because of internal (e.g. engaging in some specific behaviour because of feelings of guilt or shame) or external pressures (e.g. behaving in a particular way because you are told to do so or because the circumstances—such as the attack of an aggressor—force you to behave in that way) (Koestner, Otis, Powers, Pelletier, & Gagnon, 2008). In other words, autonomous motivated behaviour is characterized by a perceived internal locus of causality and feelings of psychological freedom and volition, while controlled motivated behaviour is typified by a perceived external locus of causality and feelings of external or internal control (Van den Broeck, Lens, De Witte, & Van Coillie, 2013). Note that autonomous and controlled motivated behaviours differ from automatic (unconscious) and controlled (conscious) self-regulation. Automatic and controlled selfregulation is broader in nature than autonomous and controlled motivated behaviour because it refers to any action—consciously (i.e. a purposively chosen behaviour) or unconsciously (i.e. behaviour without awareness)—with the intention to pursue a certain goal (Fitzsimons & Bargh, 2004).

Emotions as antecedents of motivated behaviour

Most contemporary approaches to emotions consider emotions to be multicomponential in nature, with emotions consisting of a subjective feeling component, a physiological component, a motor expression component, and an action readiness component (Kuppens, Stouten, & Mesquita, 2009). According to the componential approach to emotions, when people encounter particular events, they appraise whether these events are relevant (or not) for their well-being (i.e. whether it appears to favour or harm the individual's concerns). If the events are appraised as emotionally relevant, the different emotion components get activated, and it is this particular mixture of emotion components that constitutes the emotion (Frijda et al., 1989; Weiss & Cropanzano, 1996).

The componential approach to emotions dedicated much attention to the 'motivational aspect', as it explicitly states how emotions lead to motivated behaviour (Fontaine & Scherer, 2013, p. 172). In particular, according to this approach, one of the defining features of an emotion is the action readiness component (Frijda et al., 1989). This action readiness component, or the readiness or unreadiness to engage in interaction with the environment, is believed to lead to (general) motivation, and this motivation in turn gives rise to (motivated) behaviour (Elliot, 2006). As such, action readiness 'is what links experience and behavior: felt action readiness can be considered a reflection of the actual state of behavioral readiness' (Frijda et al., 1989; p. 213). Note that action readiness is more general than action tendencies because the latter contains a goal, a goal object, and a particular way of acting towards them, while action readiness only refers to a global state of readiness of unreadiness to interact (Frijda et al., 1989).

Apart from the notion that action readiness is one of the defining features of an emotion, componential models of emotions also demonstrated that affective events can be appraised (or interpreted) differently, with these specific patterns of appraisals being linked to particular states of action readiness motivating adaptive reaction patterns and behaviours. In other words, research on the componential models of emotions showed that the different emotions have distinctive patterns of action readiness and behaviours (Fontaine & Scherer, 2013; Frijda, 2008). For example, whereas joy creates the urge to play, push the limits, and be creative, anger is characterized by an urge to attack (Fredrickson, 2001).

Drawing on the componential models of emotions, and particularly on its action readiness component, we hypothesize that emotions predict autonomous and controlled motivated behaviour. Moreover, because the action readiness profiles are different for different specific emotions, we expect to find different emotion–motivated behaviour relationships. To test these hypotheses, we studied the predictive role of four specific emotions: anxiety, depression, happiness, and relaxation.[1] These four emotions were chosen because they are each characterized by a different action readiness, and because they balance positive and negative (high and low valence) emotions and high and low arousal (activated–deactivated) emotions, thereby covering the four quadrants of the affective circumplex (Russell, 1980). In what follows, we briefly describe each emotion as well as our hypotheses regarding their effects on autonomous and controlled motivated behaviour.

[1]In this study, anxiety, depression, relaxation, and happiness refer to emotions, as they are experienced as momentary and dynamic states.

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Hypothesis development

Anxiety is a negative (low valence) and activating (high arousal) emotion. According to Frijda and colleagues (1989), anxiety is associated with an avoidance action readiness, which means that anxiety motivates people to withdraw from the (negative) situation (Harmon-Jones, Schmeichel, Mennitt, & Harmon-Jones, 2011). However, Frijda et al. (1989) also argued that under particular circumstances, anxiety can be linked with an approach action readiness, a claim that is also confirmed by Pekrun, Goetz, Titz, and Perry (2002). For example, when a student experiences anxiety for an exam (s) he will be motivated to avoid failure, and as a consequence, (s)he will study for this exam (Pekrun, Frenzel, Goetz, & Perry, 2007). Building on these findings, we expect that the negative part of anxiety decreases autonomous motivated behaviour as it is incompatible with enjoyment, a basic building block of autonomous motivated behaviour (Pekrun et al., 2002, 2007), while the activating part of anxiety increases controlled motivated behaviour because it motivates people to avoid negative situations (Ouano, 2011; Pekrun et al., 2002). In other words, because of the negative deactivating nature of anxiety, we expect anxious feelings to positively predict controlled and negatively predict autonomous motivated behaviour (Hypotheses 1a and 1b).

Depression is situated low on pleasure and low on arousal axis in the affective circumplex model. When feeling depressed, people are not (autonomously) motivated to achieve goals, which represents the low arousal aspect of depression (Pekrun et al., 2002). Indeed, although depressed feelings are uncomfortable (low valence), people who experience them are generally not motivated for any activity (Dickson & MacLeod, 2004), which is the characteristic feature of amotivation. People do not feel in control when they experience depression, as their action readiness is related with feelings of helplessness and not feeling in command (Frijda et al., 1989). For example, when feeling depressed, people prefer being alone, take a nap, or just sit and think, as they do not have any desire for goal achievement (Cunningham, 1988; Roseman, Wiest, & Swartz, 1994). Therefore, we expect depressed feelings to be negatively related to both controlled and autonomous motivated behaviours (Hypotheses 2a and 2b).

Relaxation is a positive (high valence), deactivating (low arousal) emotion. The deactivating part of this emotion immediately diminishes motivated behaviour, whereas the positive part fosters motivated behaviour in the long term (Pekrun et al., 2002). Relaxation is thus associated with momentary amotivation, as one does not aim for momentary goals. This implies that relaxation is counterproductive for goal achievement in the short term (Baas, De Dreu, & Nijstad, 2008; Bagozzi, Baumgartner, & Pieters, 1998; Smith & Bargh, 2008). In line with this, Yesavage, Rose, and Spiegel (1982) found that for motivated people, relaxation reduced the motivated behaviour to perform a task and also decreased the performance on that task. As we are interested in the short-term effects of relaxation, we expect relaxed feelings to relate negatively to both autonomous and controlled motivated behaviours (Hypotheses 3a and 3b).

Happiness is a high valence, high arousal emotion that is associated with the enhancement of motivated behaviour (Pekrun et al., 2002). Happiness increases autonomous motivated behaviour when people can voluntary choose the activity they want (Isen & Reeve, 2006). According to Frijda and colleagues (1989), feeling happy is related with an approach action readiness. As such, happiness stimulates people to take part in activities (Cunningham, 1988; Fisher, 2010; Lench, Flores, & Bench, 2011) and to voluntarily approach things or experiment with certain actions (Fredrickson, 2001). When people feel happy, they like to be with people and be active—such as going to a party (Cunningham, 1988). Hence, we expect happiness to positively precede autonomous motivated behaviour, whereas we hypothesize a negative relationship between happiness and controlled motivated behaviour (Hypotheses 4a and 4b).

In summary, we expect that the directional relationship from emotions to motivated behaviour is emotion specific, which means that it is determined by the position of the specific emotion on both the valence and the arousal dimension. In particular, the position on the arousal dimension is of primary importance because it determines whether motivated behaviour will increase (for high arousal emotions such as anxiety and happiness) or decrease (for low arousal emotions such as depression and relaxation). Subsequently, when arousal is high, the valence dimension determines whether the increase in motivated behaviour is an increase in autonomous (for high valence emotions such as happiness) or rather in controlled (for low valence emotions such as anxiety) motivated behaviour.

To test our hypotheses, we implemented an experience sampling study in which people were asked to report on their momentary emotions and motivated behaviour at randomly sampled moments throughout their daily life. This method has two important advantages. First, by using lagged predictors, we can test the directionality of the relationship between emotions and motivated behaviour. Second, it allows to effectively capture variation in motivated behaviour and emotions, which is important because emotions and motivated behaviour strongly depend on the situations people encounter in their daily lives (Fisher, 2002; Gooty, Gavin, & Ashkanasy, 2009; Seo, Barrett, & Bartunek, 2004). On the downside, however, an experience sampling study does not allow for making strong causal interferences. Therefore, we also conducted an experiment (Study 2) where we investigated whether emotions caused motivated behaviour.

STUDY 1

Methods

Participants

Fifty Australian university students, 26 females and 24 males, took part in the study. Participants were recruited through the University's Careers & Employment service, and they were paid AU$40 for participating. The mean age of the participants was 21.58 years ($SD = 3.871$). Thirty participants were of Asian and 20 of European descent.

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Procedure

Data were collected using Tungsten E2 palmtops, which were programmed with Experience Sampling software (Barrett & Barrett, 2000). Each participant received a palmtop computer that was programmed to beep 10 times a day for 7 consecutive days during the participant's waking hours (the range in which the beeps occurred differed between participants as a function of their individual waking hours, but the minimum time interval between two beeps was at least 5 minutes). The beeps were programmed at semi-random intervals. Waking hours were divided into 10 equal intervals, and one beep occurred randomly within each interval. Upon each beep, participants were asked to report on their current emotions and the autonomous and controlled behaviour they performed since the previous beep. The palmtops were programmed to shut down after 90 seconds when a beep was not responded to. In total, the participants responded to 2608 of the 3630 beeps, which is equivalent to a response rate of 74.5%. Note that beeps across 2 days were not considered consecutive in the analysis.

Before the data collection started, participants attended an introduction session. In this session, participants were informed about the study, and they filled out a questionnaire to collect demographic information. Participants also received a programmed palmtop and instructions on how to use it. To familiarize the participants with the palmtop and the questionnaire, the experimenter and the participants went through the first beep together.

After collecting data, a closing session was organized. During this closing session, participants returned their palmtops and finished the demographic questions. In this session, participants received the compensation for their participation, and they were debriefed.

Measurements

Emotions were assessed with single-item scales for depression, anxiety, happiness, and relaxation. The items were as follows: 'At the moment, I feel depressed', 'At the moment, I feel anxious', 'At the moment, I feel happy', and 'At the moment, I feel relaxed.' Ratings were given on a six-point rating scale, ranging from for example *not at all depressed* to *very depressed*.

Autonomous and controlled motivated behaviour was assessed with two dichotomous items: 'Since the previous beep, I did something that I wanted to do' (autonomous motivated behaviour) and 'Since the previous beep, I did something that I had to do' (controlled motivated behaviour). Participants answered both items with either *yes* or *no*. While such single-item measures are uncommon in cross-sectional research, they are common in experience sampling studies as they reduce the response burden on the participants (Miner, Glomb, & Hulin, 2005; Uy, Foo, & Aguinis, 2010).

Analysis

We analysed the data using the lme4 package in R. Because of (1) the nested data structure with measurements nested within days, and days nested within participants, and (2) the fact that the measurements of autonomous and controlled motivated behaviour were dichotomous in nature, we performed three-level binary logistic regression analyses. More specifically, we tested eight different models. In each model, we predicted autonomous (or controlled) motivated behaviour at time t from one of the four emotions at time $t-1$. Moreover, to account for autocorrelation in the data (i.e. the fact that motivated behaviour at time t may be a function of motivated behaviour at time $t-1$), we added the dependent variable (i.e. autonomous or controlled motivated behaviour) at time $t-1$ as a predictor. Note that the inclusion of this autoregressive effect implies that we tested whether changes in autonomous and controlled motivated behaviour could be predicted from the specific emotions. We also checked whether the effects of the predictors varied across persons and across days. To this end, we tested each slope for randomness on a one-by-one basis using the Likelihood Ratio Test. As tests for random slopes have less statistical power than tests with fixed effects, we used $p < .10$. For reasons of parsimony, non-significant random slopes were trimmed (Snijders & Bosker, 1999). Finally, because we were interested in within-person relationships, all predictors were group-mean centred (or centred around the person's own average) before entering them into the analysis (Preacher, Zyphur, & Zhang, 2010).

Results

Descriptive statistics

Table 1 shows the means and standard deviations of all study variables and their within-person correlations (i.e. the correlations between the group-mean centred variables). As can be seen in Table 1, autonomous motivated behaviour was positively related to the positive and negatively related to the negative emotions. Moreover, the relationships between controlled motivated behaviour and the different emotions were much weaker, with relaxation and depression being negatively and anxiety being positively related to it. Finally, the two positive and the two negative emotions correlated positively, whereas the correlations between positive and negative emotions were negative.

Hypothesis testing

To test whether the four different emotions preceded autonomous and controlled motivated behaviour, we predicted autonomous/controlled motivated behaviour at time t from one of the four emotion experienced at time $t-1$ and motivated behaviour at time $t-1$. The parameter estimates of these models are reported in Table 2. These analyses revealed that the different emotions indeed related differently to autonomous and controlled motivated behaviour. In particular, when people experienced more happiness ($\hat{\gamma}_{100} = 0.17$; $p = .008$) and less anxiety ($\hat{\gamma}_{100} = -0.15$; $p = .012$) than usual, this was followed by an increase in autonomous motivated behaviour. No relationship was found between depressed feelings and autonomous motivated behaviour ($\hat{\gamma}_{100} = -0.01$; $p = .908$). For relaxation, we also found no evidence for a general relationship with autonomous motivated behaviour ($\hat{\gamma}_{100} = 0.04$; $p = .488$). Nevertheless, we did find that people differed in the way in which relaxation related to autonomous motivated

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Table 1. Means, standard deviations, and correlations of autonomous motivated behaviour, controlled motivated behaviour, and four emotions: happiness, relaxation, anxiety, and depression (all variables are group-mean centred before the correlations were computed)

	Mean (*SD*)	1	2	3	4	5
1. Autonomous motivated behaviour	0.77 (0.42)	–				
2. Controlled motivated behaviour	0.71 (0.45)	.02	–			
3. Happy	4.13 (1.26)	.23**	−.02	–		
4. Relaxed	4.00 (1.39)	.19**	−.09**	.46**	–	
5. Anxious	2.30 (1.36)	−.11**	.06**	−.31**	−.33**	–
6. Depressed	1.91 (1.23)	−.13**	−.03*	−.32**	−.20**	.37 **

*$p < .05$; **$p < .01$.

Table 2. Parameter estimates for the eight models examining the relationship between autonomous and controlled motivated behaviour on one hand and happiness, relaxation, anxiety, and depression on the other hand

		Autonomous motivated behaviour				Controlled motivated behaviour			
		Happiness	Relaxation	Anxiety	Depression	Happiness	Relaxation	Anxiety	Depression
Fixed components									
Intercept	$\hat{\gamma}_{000}$	1.51***	1.52***	1.51***	1.51***	2.91***	2.89***	2.90***	3.10***
Emotion$_{t-1}$	$\hat{\gamma}_{100}$	0.17**	0.04	−0.15*	−0.01	−0.08	−0.09†	0.10	−0.11
Motivated behaviour$_{t-1}$	$\hat{\gamma}_{200}$	0.83***	0.86***	0.89***	0.92***	−1.31***	−1.29***	−1.30***	−0.48***
Random components day-level									
Intercept	$\hat{\tau}_{0jk}$	0.21***	0.19***	0.21***	0.21***	2.67***	2.52***	2.61***	2.57***
Emotion$_{t-1}$	$\hat{\tau}_{1jk}$	–	–	–	–	–	–	–	–
Motivated behaviour$_{t-1}$	$\hat{\tau}_{2jk}$	–	–	–	–	1.25*	1.19*	1.25*	1.20**
Random components person-level									
Intercept	$\hat{\tau}_{00k}$	1.18***	1.21***	1.19***	1.17***	1.46***	1.46***	1.46***	2.62***
Emotion$_{t-1}$	$\hat{\tau}_{10k}$	–	0.04†	–	–	–	–	–	–
Motivated behaviour$_{t-1}$	$\hat{\tau}_{20k}$	0.45*	0.47*	0.43†	0.46*	–	–	–	0.27†

$^{\dagger}p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (all p-values are two-tailed).

behaviour ($\hat{\tau}_{10k} = 0.04$; $p = .091$), with the estimated slopes for relaxation ranging from −.28 to .35. These findings imply that for some people, increases in relaxation led to more, whereas for other people, they led to less autonomous motivated behaviour.

With respect to controlled motivated behaviour, we found a negative (marginally significant) relationship with relaxation ($\hat{\gamma}_{100} = -0.09$; $p = .078$), which implies that when people experienced more relaxation than usually, they engaged less in controlled motivated behaviour. For happiness ($\hat{\gamma}_{100} = -0.08$; $p = .199$), anxiety ($\hat{\gamma}_{100} = 0.09$; $p = .137$), and depression ($\hat{\gamma}_{100} = -0.11$; $p = .134$), we found no relationship with controlled motivated behaviour.

Discussion

In general, our results were in line with the idea that different emotions relate in different ways to autonomous and controlled motivated behaviour. In particular, and in line with Hypothesis 1a, we demonstrated that increases in anxiety were followed by decreases in autonomous motivated behaviour. However, we did not find that anxiety increased the level of controlled motivated behaviour (Hypothesis 1b). As such, the findings provided only partial support for the conceptualization of anxiety as a negative, activating emotion as we only found an effect of the negative (low valence) aspect of anxiety, which decreased autonomous motivated behaviour because of its incompatibility with enjoyment (Pekrun et al., 2002, 2007). This result also relates to the avoidance action readiness of anxiety (Frijda et al., 1989).

Concerning depression, we found no cross-lagged relationship between changes in depressed feelings and changes in the level of autonomous and controlled motivated behaviour. Therefore, the hypothesis that depressed feelings would decrease both the initiation of autonomous and controlled motivated behaviour could not be confirmed. One reason for this may be that in our sample, all respondents experienced very low levels of depression (i.e. an average of 1.91 on a six-point scale with 73% of the scores being 1 or 2). Although this was not surprising given the non-clinical population that our sample was taken from, the restricted range in the depression scores may be responsible for the fact that we did not find the hypothesized relationships. In line with this reasoning, depressed feelings are caused by certain negative events that one experiences as uncontrollable (Brown & Siegel, 1988; Frijda et al., 1989). These events, however, are rather rare because they are related with a feeling of helplessness and they are experienced as upsetting.

Regarding relaxation, which is a high valence and low arousal emotion, our results demonstrated that relaxation was (marginally) negatively related to controlled motivated behaviour, thereby supporting Hypothesis 3b. Moreover,

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the ambiguous action readiness profile of relaxation—with a deactivating part, which is hypothesized to negatively impact motivated behaviour, and a positive part, which is expected to foster motivated behaviour (Pekrun et al., 2002)—was also reflected in our results. In particular, instead of finding a generally valid relationship between relaxation and autonomous motivated behaviour, we found that this relationship was subject to sizeable individual differences. For some people, increases in relaxation led to more, while for others, it led to less autonomous motivated behaviour. Although this finding was not anticipated, it links up with the deactivating component of relaxation that is expected to temper autonomous motivated behaviour, and the positive component that is believed to promote autonomous motivated behaviour. Indeed, regarding the latter, previous research showed that because of the positive emotional component, autonomous motivated behaviour and relaxation are closely related (Amabile, 1985; Vallerand, 1997).

Finally, our results showed that changes in happiness positively preceded changes in autonomous motivated behaviour, thereby confirming Hypothesis 4a. Hypothesis 4b, however, was not confirmed, as we did not found a decrease in controlled motivated behaviour following increases in happiness. These results seem to imply that when people feel happy, no external or internal contingencies are needed, which is in line with the results of Isen and Reeve (2006), who demonstrated that happiness leads to autonomous motivated behaviour. In terms of action readiness, happiness was related with approach (Frijda et al., 1989). People thus (voluntary) approach things they find interesting and enjoyable (Fisher, 2010).

In summary, although not all of our hypotheses were confirmed, the results did demonstrate that the different emotions were differently related to autonomous motivated behaviour. Concerning the high arousal emotions, we found support for the idea that emotions negative in valence (in our case anxiety) related negatively, whereas emotions positively in valence (in our case happiness) related positively to autonomous motivated behaviour. For the low arousal emotions, however, the results were less clear-cut. Depression, which is a low arousal, low valence emotion, appeared to have no relationship with autonomous motivated behaviour, whereas the relationship between relaxation (high valence, low arousal) and autonomous motivated was subject to individual differences in the sense that for some people, the relationship was positive, while for other individuals, it was negative.

For controlled motivated behaviour, only the relationship with relaxation was (marginally) significant. One reason might be that by measuring controlled motivated behaviour with the item 'Since the previous beep, I did something that I had to do', we primarily tapped into the external type of controlled motivated behaviour. According to SDT, controlled motivated behaviour can be divided into two types: externally motivated behaviour and introjected motivated behaviour (Ryan & Deci, 2000, 2002; Vansteenkiste, Niemiec, & Soenens, 2010). *Externally motivated behaviour* pertains to behaviour that is shown to avoid punishment or to get a reward. An example of this is an employee who completes tasks because (s)he will not be paid if the task is not completed. *Introjected motivated behaviour*, in turn, refers to behaviour that is shown because one feels internally pressured to engage in it. This internal pressure might originate from the motivation to avoid feelings of shame or guilt, or from an urge to gain self-esteem or pride. For example, an employee who performs tasks because (s)he would feel guilty if (s)he did not finish them in time shows introjected motivated behaviour. Thus, whereas controlled motivated behaviour pertains to performing behaviours because of internal (i.e. feelings of guilt or shame) or external pressure (i.e. avoid punishment or get a reward), our measurement probably tapped more into external motivated behaviour than into introjected motivated behaviour. Because introjected motivated behaviour by definition refers to emotions such as shame and guilt, while externally motivated behaviour does not, it is not surprising that the predictive role of emotions for externally motivated behaviour was limited.

In terms of strengths and weaknesses, one particular strength of this study was that by using an experience sampling study, the ecological validity of our findings was high. However, the study is also subject to some limitations. The most important one is that whereas we used methodological (i.e. experience sampling) and statistical (i.e. lagged effects) tools to test for directionality, no strict causal inferences could be made. In other words, because an experience sampling study does not allow controlling for possible confounds, the evidence regarding causality was not conclusive. To overcome this limitation, we performed a lab experiment with the explicit aim to test the causal relationship from emotions to autonomous motivated behaviour.

STUDY 2

In our first study, we demonstrated that in real life, some emotions predict the emergence of motivated behaviour. However, the experience sampling design cannot test the causality of this relationship. Therefore, we set up a second study. The first goal of this study was to replicate the results that were found in the first study using a different methodology and different subjects. Second, we wanted to test whether the relationships that were found in our first study can be interpreted in a causal way. Because the results of our first study demonstrated that emotions were mainly related to autonomous motivated behaviour, we chose to focus on this type of motivated behaviour only. In particular, we studied the relationship between the four emotions of the experience sampling study (i.e. anxiety, depression, happiness, and relaxation) and intrinsic motivated behaviour, which is the most self-determined and autonomous type of motivated behaviour (Deci & Ryan, 2008).

Method

Participants

Two hundred and seventeen first-year psychology students took part in this study. By participating, students could gain credit points. Participants were 166 females and 51 males with a mean age of 19.22 years ($SD = 2.40$).

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Procedure

All participants were randomly assigned to one of the five experimental conditions: an anxiety ($N = 43$), depression ($N = 42$), happiness ($N = 47$), relaxation ($N = 42$), or control condition ($N = 43$). After being assigned to one of the conditions, each participant signed an informed consent form before the start of the experiment. To disclose the real purpose of the experiment, a cover story was used in which participants were told that the experiment was about the impact of memory recall on cognitive performance. Next, participants filled in the Dutch questionnaire on the experience and evaluation of work (Van Veldhoven & Meijman, 1994), which measured their baseline level of a series of emotions. Afterwards, they were instructed to remember one vivid event in which they felt anxious, depressed, happy, or relaxed, depending on whether they were in the anxiety, depression, happiness, or relaxation condition, respectively. Participants in the control condition were instructed to remember an everyday occurrence. In all conditions, participants were instructed to focus on that particular event. To facilitate memory retrieval and reactivation of their remembered emotions, participants were required to write down a detailed description of this event. Afterwards, they thought about the event for 2 minutes. While doing so, participants heard music that facilitated the recall. After the manipulation stage, participants filled in an emotion questionnaire. Subsequently, during 5 minutes, students solved anagrams. After this task, participants were told that their answers needed to be processed and that this would take approximately 5 minutes. In the meanwhile, they could solve some more anagrams, read a magazine, or do nothing. After 5 minutes, they filled in a motivation questionnaire and provided some demographic information. After the experiment, students were debriefed.

Material

Anxiety, depression, happiness, and relaxation were induced using a combination of a recall procedure and music, as this method has been shown to be successful in inducing stable and strong emotions (Eich, Ng, Macaulay, Percy, & Grebneva, 2007). The music fragments were chosen based on previous research. The anxiety group listened to 'Mars the bringer of war' composed by Holst (Baumgartner, Esslen, & Jäncke, 2006). To induce depression, participants listened to Barber's 'Adagio for strings' (Baumgartner et al., 2006). Happiness was induced by playing the third movement of Beethoven's sixth symphony (Baumgartner et al., 2006). In the relaxation condition, participants listened to Pachelbell, 'Canon in D' (Knight & Rickard, 2001). The control condition listened to neutral music: 'Venus' by Holst (Mitterschiffthaler, Fu, Dalton, Andrew, & Williams, 2007).

The emotion manipulation was tested with the Dutch questionnaire on the experience and evaluation of work (Van Veldhoven & Meijman, 1994), as this questionnaire measures the four quadrants of Russel's affective circumplex model (1980). The following emotions were assessed with this questionnaire: tenseness, optimism, gloominess, contentedness, depression, calmness, worry, miserableness, relaxation, uneasiness, cheerfulness, and enthusiasm. Moreover, we added the emotions anxiety and happiness to have a manipulation check for the anxiety and happiness condition. The emotion words happiness and cheerfulness were combined into a happiness scale, which had a good reliability for both the pretest ($r = .56$, $p < .001$) and the posttest ($r = .72$, $p < .001$). The relaxation scale comprised the emotion words relaxation and calmness, and had a good reliability for both at the pretest ($r = .75$, $p < .001$) and the posttest ($r = .86$, $p < .001$). Anxiety, tenseness, and uneasiness constituted the anxiety scale. This scale was reliable for both the pretest (*Cronbach's Alpha* = .77) and the posttest (*Cronbach's Alpha* = .88). Finally, the depression scale encompassed the emotion words depression, gloominess, and miserableness (see also Shaver, Schwartz, Kirson, & O'connor, 1987; Weiss, Suckow, & Cropanzano, 1999). The depression scale was also reliable both at the pretest (*Cronbach's Alpha* = .91) and the posttest (*Cronbach's Alpha* = .93).

As we were interested in autonomous motivated behaviour—and intrinsic motivated behaviour in particular—we focused on a behavioural rather than on a self-reported measure of autonomous motivated behaviour. This was carried out by measuring it during the free-choice period, a period that was induced by telling participants that their answers needed to be processed before the experiment could continue. During this period, participants could voluntarily choose to continue to work on the anagrams, read a magazine, or do nothing. Whether participants continued working on anagrams or not served as an indicator of autonomous motivated behaviour (see Ratelle, Baldwin, & Vallerand, 2005). This behavioural measure was based on SDT's premise that intrinsic motivated behaviour equates with choice (Deci & Ryan, 1985). Thus, intrinsic motivated behaviour is considered present if people voluntarily choose to continue working on the task. The anagram task is commonly accepted as a free-choice behaviour measure of intrinsic motivated behaviour (see Eisenberg & Cameron, 1996; Friedman, Deci, Elliot, Moller, & Aarts, 2010; Pulfrey, Darnon, & Butera, 2013; Zapata-Phelan, Colquitt, Scott, & Livingston, 2009).

Results

First, we removed all participants for whom the emotion manipulation did not work. In particular, participants who did not report an increase in the manipulated emotion (as measured by the difference between the scale score for that emotion before and after the emotion manipulation) were removed from the data. By doing so, three participants were removed from the anxiety condition, six from the depression condition, 23 from the happiness condition, and seven from the relaxation condition.

Next, we performed a manipulation check using a series of paired sample *t*-tests. This manipulation check showed that compared with the baseline measurement, there was a significant increase of depression in the depression condition [$t(35) = -10.274$, $p < .001$], of anxiety in the anxiety condition [$t(39) = -9.433$, $p < .001$], of happiness in the happiness condition [$t(23) = -10.217$, $p < .001$], and of relaxation in the relaxation condition [$t(34) = -10.854$, $p < .001$].

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In the neutral condition, there was no significant difference in depression [$t(41) = -0.795$, $p = .431$], happiness [$t(42) = 1.399$, $p = .169$], and relaxation [$t(42) = 0.302$, $p = .764$] between the baseline emotions and the emotions measured after the manipulation, while the level of anxiety decreased slightly [$t(42) = 6.545$, $p < .001$].

Subsequently, we tested whether continuing to work on the anagrams or not was affected by each of the manipulated emotions (Figure 1). To this end, we conducted a series of binary logistic regression analyses in which we compared each pair of experimental conditions. Because of the disproportional number of female participants in our sample, we controlled for gender in all analyses. The results (Table 3) revealed that there was a statistically significant difference between the anxiety (dummy value 1) and the happiness (dummy value 0) condition ($\beta = -1.10$; $p = .042$; odds ratio = 3.00). Moreover, we also found a marginally significant difference between the anxiety (dummy value 1) and the relaxation (dummy value 0) condition ($\beta = -0.94$, $p = .058$; odds ratio = 2.25) and between the happiness (dummy value 1) and the control (dummy value 0) condition ($\beta = 0.94$, $p = .079$; odds ratio = 2.53). Following Cohen's (1988) guidelines, the effect sizes are medium (i.e. an odds ratio of 2.47) to large (i.e. an odds ratio of 4.25). For all other comparisons (which turned out to be non-significant), the effect sizes ranged from 1.20 to 1.89, which implies that these effects were small (i.e. an odds ratio of 1.44) according to Cohen's criteria.

Discussion

The results of our experimental study suggest that emotions may cause intrinsic motivated behaviour. In particular, causal interferences can be made when three necessary conditions are fulfilled. First, the dependent and independent variables should be associated. Second, the independent variable should temporally precede the dependent variable. Third, no other variables should influence the relationship between the independent and the dependent variable (Thrash, Elliot, Maruskin, & Cassidy, 2010). In the first and second studies, we showed that the first two conditions hold. The necessary third condition of isolation (together with the other two conditions) was fulfilled in our second study.



Figure 1. The proportion of participants that continued working on the anagram task (with associated standard errors).

The results of the lab experiment showed that there was a difference in intrinsic motivated behaviour between the anxiety condition on one hand and the happiness and relaxation condition on the other hand, thereby replicating the findings of the first study. In particular, people who felt anxious engaged less in intrinsic motivated behaviour than people who experienced feelings of happiness or relaxation. Moreover, our data suggest that this difference might be due to the fact that people's intrinsic motivated behaviour increased when experiencing positive emotions, as we found a marginally significant difference between the happiness and the control condition. Conversely, we did not find a significant decrease in intrinsic motivated behaviour for anxiety and depression in comparison to the control condition (note that the effect sizes for these comparisons were small, so the failure to detect statistically significant differences is probably not due to power issues). Whereas this finding is at odds with the results of the experience sampling study for anxiety, the results for depression do mimic those of the experience sampling study. Altogether, the findings of our experiment seem to provide some support for the notion that 'being intrinsically motivated involves individuals experiencing pleasant emotions such as enjoyment and feeling free and relaxed' (Vallerand, 1997; p. 279).

GENERAL DISCUSSION

In the present paper, we made two important contributions. First, we showed that some specific emotions can cause autonomous motivated behaviour. Second, our results demonstrated that—regarding the effects of emotions on autonomous motivated behaviour—it is important to go beyond the positive/negative distinction, towards a more fine-grained treatment of emotions. In support of this claim, both the results of our experience sampling study and those of the lab experiment showed that different emotions were differently related to autonomous motivated behaviour. In what follows, we will discuss the theoretical implications of these findings.

Implications for theory

Drawing on the componential view of emotions, we showed that specific emotions, each having a different action readiness profile, were differentially related to autonomous motivated behaviour. Especially variation in happiness (i.e. high on valence and arousal), anxiety (i.e. low on valence and high on arousal), and relaxation (i.e. high on valence and low on arousal) related in different ways to variation in autonomous motivated behaviour. Consequently, our results demonstrated that both the valence and arousal dimension of emotions are relevant in the emergence of motivated behaviour, as it is the specific combinations of valence and arousal that is linked to a particular action readiness profiles, which is in turn linked to autonomous and controlled motivated behaviour. These findings demonstrated that it is important to go beyond the positive–negative (i.e. valence) distinction when studying the role of emotions,

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Table 3. Parameter estimates (i.e. β coefficients) and effect sizes (i.e. odds ratio) of the binary logistic regressions in which continuing to work on the anagrams or not is predicted by an intercept, a pair of two experimental manipulations, and gender

	Intercept	Manipulation	Gender (0 = male; 1 = female)	Odds ratio
Anxiety (1) vs control (0)	−0.93†	−0.27	0.95	1.19
Happiness (1) vs control (0)	−0.15	0.94†	−0.12	2.53
Depression (1) vs control (0)	−0.89†	0.45	0.90†	1.58
Relaxation (1) vs control (0)	−0.26	0.62	0.88	1.89
Anxiety (1) vs happiness (0)	0.65	−1.10*	0.06	3.00
Anxiety (1) vs depression (0)	−0.80	−0.77	1.36*	1.88
Anxiety (1) vs relaxation (0)	−0.63	−0.94†	1.36*	2.25
Happiness (1) vs depression (0)	0.59	0.47	.13	1.60
Happiness (1) vs relaxation (0)	0.36	0.29	0.06	1.58
Depression (1) vs relaxation (0)	−0.52	−0.17	1.21*	1.20

†$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (all p-values are two-tailed).

as an exclusive focus on the valence dimension only (i.e. positive vs negative) might obscure important differences.

Moreover, by focusing on autonomous and controlled motivated behaviour, we went beyond the treatment of motivated behaviour as a unitary construct. Our results underlined the relevance of this distinction as mainly the autonomous type of motivated behaviour was predicted by the emotions that the participants experienced. Whereas we did not anticipate this difference, the finding is not surprising as the definition of intrinsically motivated behaviour—which is the most autonomous form of motivated behaviour—explicitly refers to positive emotions such as enjoyment and interest (Ryan & Deci, 2002).

The awareness that emotions precede and sometimes cause autonomous motivated behaviour has important theoretical implications for SDT as well. According to SDT, autonomous and controlled motivated behaviours are affected by the satisfaction or thwarting of three psychological needs: the need for autonomy (i.e. the need to initiate one's own behaviour), competence (i.e. the need to feel competent and effective), and relatedness (i.e. the need to feel accepted by others). In particular, increased need satisfaction leads to autonomous motivated behaviour, whereas thwarting of the needs leads to controlled motivated behaviour (Deci & Ryan, 2008). While there is a large body of literature that supports the role of need satisfaction and need thwarting in the motivation-eliciting process, there is virtually no research on the role of emotions within the SDT framework (Deci & Ryan, 2002). The major reason for this is that SDT traditionally considered emotions to be an epiphenomenon of motivated behaviour (Isen & Reeve, 2006). By demonstrating that some of the emotions in our study preceded (Study 1) and caused (Study 2) autonomous motivated behaviour, we challenged the dominant cognitive view on motivated behaviour in SDT research. Regarding the role of emotions and cognitions (i.e. need satisfaction) in SDT, we believe that emotions and cognitions interact with each other in the coming about of autonomous motivated behaviour (see also Hofmans, Gelens, & Theuns, 2013; Storbeck & Clore, 2007). In particular, we believe that the relationship between emotions and cognitions is a reciprocal one. First, emotions provide information that guides cognitions, and because the different emotions each has unique subjective feeling, physiological, motor expression, and action readiness components, the different emotions each provides unique information to guide cognitions and subsequent autonomous motivated behaviour. Second, cognitions also influence emotions. According to appraisal theory, when encountering a certain affective situation, people first quickly appraise this situation as threatening (or not) for their own well-being. In a second appraisal, people (cognitively) incorporate more details when evaluating this affective event, which results in the experience of specific emotions (Lazarus, 1999; Weiss & Cropanzano, 1996). As such, we believe that the interplay between emotions and cognitions takes place in the form of a complicated dynamic and reciprocal interaction.

Limitations and future research

When interpreting the results of our studies, some limitations should be taken into account. First, whereas we found tentative support for the predictive validity of emotions for autonomous motivated behaviour, not all hypotheses were supported. One of the reasons is that observable behaviour is not only a function of emotions and their action readiness component, but also of the physical and cultural constraints of the environment, and the regulation mechanisms used by the person. Because of this reason, the attribution of observable behaviour to an inner drive instigated by the emotion process is not an easy task (Fontaine & Scherer, 2013).

Second, in Study 1, important events may have occurred in between two consecutive measurement moments that may have influenced the relationship between emotions and motivated behaviour. To minimize this possibility, we used short time lags (i.e. an average duration of 37 minutes between two consecutive beeps). Moreover, in Study 2, we controlled for this possible confounder by setting up an experimental design.

Third, we did not measure environmental factors, while the environment is believed to influence the experience of both emotions and motivated behaviour (via appraisals and need satisfaction, respectively). Because of that reason, a possible alternative explanation for the relationship between emotions and motivated behaviour is that both derive from environmental factors (such as a pending deadline for which

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one is ill prepared) but are themselves not causally related. However, in Study 2, this alternative explanation was ruled out by controlling for these environmental influences in a lab experiment.

Fourth, in our experience sampling study, we measured autonomous and controlled motivated behaviour with dichotomous, single-item measures. The clear advantage of this type of measurement is that it matches the concept of behaviour, which can be present or absent. A disadvantage is that by not asking participants to describe their behaviour, possible insightful information about the behaviour was not recorded. Therefore, future studies may want to record a description of the behaviour instead of collecting yes/no ratings.

Fifth, we only focused on the most autonomous form of motivated behaviour (i.e. intrinsic motivated behaviour) and the most controlled form of controlled motivated behaviour (i.e. extrinsic motivated behaviour). Additional studies are thus needed to examine the directional relationship between (specific) emotions and the different subtypes of autonomous and controlled motivated behaviour.

Sixth, the number of participants in each of the experimental conditions in Study 2 was rather small, especially after filtering out participants for whom the experimental manipulations did not work. Moreover, this sample consisted mainly of female participants. This experiment should thus be replicated with a larger and more representative sample.

Finally, to our knowledge, this study was the first to focus on specific emotions as antecedents of autonomous and controlled motivated behaviour. Therefore, further research is needed to verify our results in other settings. Our research can also be expanded with additional emotions such as enthusiasm, contentment, anger, and disappointment, as all these emotions are, based on their action readiness, hypothesized to have different motivational forces (Frijda, 2008; Frijda et al., 1989; Ouano, 2011; Pekrun et al., 2002). It can thus be argued that because our results demonstrated the importance of the valence and arousal dimension in the emergence of motivated behaviour, future research is needed as we only focused on one emotion from each quadrant of the affective circumplex model.

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