

The effects of autonomy-supportive versus controlling environments on self-talk

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Abstract Based within a self-determination theory framework (SDT: Deci and Ryan, *Intrinsic motivation and self-determination in human behaviour*. Plenum Publishing Co., New York, 1985), the present study examined the effects of manipulating social-contextual conditions on the content of individuals' self-talk. Seventy student volunteers were randomly assigned to a controlling or autonomy-supportive experimental condition. Participants were instructed to 'think-aloud' throughout a 10-min computerized task during which self-verbalizations were recorded. Audio recordings were transcribed verbatim, and then analysed using the Linguistic Inquiry and Word Count Program (LIWC; Pennebaker et al., LIWC2001; Linguistic Inquiry and Word Count (software and manual). Lawrence Erlbaum, Mahwah, NJ, 2001). Inductive content analyses were also conducted. Triangulation of the quantitative and qualitative findings revealed that in the autonomy-supportive condition, individuals' self-talk was more informational and less controlling, with participants using more positive emotional words and assents, and fewer negative emotional words, swear words, and first person references than in the controlling condition. The findings suggest that social-context can affect cognitive factors such as self-talk and further support the promotion of autonomy-supportive environments.

Keywords Self-determination theory · Cognitions · Private speech · Social context

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Introduction

Self-determination theory (SDT: Deci and Ryan 1985, 1991) is an approach to understanding human motivation that holds that the satisfaction of certain innate psychological needs is the basis for self-motivation, psychological growth, and optimal well-being. Central to SDT is a consideration of the extent to which the regulation of a behavior has become internalized and integrated into the person's sense of self so that they feel that they are self-determining in their activities. In addition, SDT specifies the social-contextual conditions that facilitate these processes (Ryan and Deci 2000). Specifically, the theory posits that social contexts that provide support for the satisfaction of innate basic psychological needs for competence, autonomy and relatedness promote the natural processes of internalization, integration of the self, and healthy psychological development. Conversely, social contexts which thwart basic need satisfaction are considered antagonistic to psychological growth. Competence involves feeling that one can deal effectively with one's environment and having the capacity to effect outcomes. Autonomy is defined as a need for volition, for behavior to be aligned with one's integrated sense of self combined with a perception that the self is the origin or driving force behind behavior (Deci and Ryan 2000; Reeve et al. 2003). Relatedness involves the need to experience connectedness with others and to have satisfying and supportive social relationships.

According to Deci and Ryan (2000), satisfaction of the needs for competence and relatedness can facilitate the partial internalization of behavioral regulation but for regulation to be fully internalized, support for autonomy is essential. Thus in SDT satisfaction of the need for autonomy is conceptualized as the critical element in the development of self-determined forms of motivation and in turn the

positive behavioral and affective outcomes associated with this (Deci and Ryan 2000). Given this emphasis on the importance of autonomy, much SDT research has attempted to determine specific contextual elements that characterize an autonomy-supportive environment. For example, Reeve (2002) has delineated specific behaviors associated with autonomy support. They include developing a personally meaningful rationale for engaging in a behavior, minimizing external controls such as contingent rewards and punishments, providing opportunities for participation and choice, and acknowledging negative feelings associated with engaging in difficult tasks. Further proposed features of autonomy-supportive environments include the provision of informational feedback (Ryan and Deci 2006) and shared decision-making (Reeve et al. 1999).

There has been relatively consistent support for the predictions made within SDT regarding the benefits of autonomy-supportive environments compared to more controlling contexts. Autonomy-supportive environments have been positively associated with more self-determined forms of behavioral regulation (e.g., Grolnick et al. 1991; Gagné et al. 2003), enhanced performance and persistence, more in-depth information processing, and greater well-being (Cooper et al. 1995; Vansteenkiste et al. 2005). Both interpersonal behaviors and the content and the nature of communications from others have been conceptualized as key determinants of whether an environment is perceived as autonomy-supportive or controlling. For example, in an early experimental study, Koestner et al. (1984) examined the effects of interpersonal style, contrasting the effects of informational and controlling limit-setting styles, and a no-limit-setting style. It was found that children's intrinsic motivation, enjoyment, and painting quality were undermined by a controlling style and locution relative to informational and no-limit conditions.

Numerous experimental studies have provided additional support for the notion that interpersonal communications can affect the extent to which the environment supports autonomy and promotes autonomous regulation of behavior. For example, Deci et al. (1994) manipulated the social context of a computer-based targeting task using the presence or absence of three experimenter-delivered factors: providing a meaningful rationale, acknowledging participants' feelings about the behavior, and conveying a sense of choice. Deci et al. (1994) found that when at least two of the three facilitating factors were present, participants' behavioral regulation was more self-determined. Participants also reported a greater sense of value and enjoyment for the activity. Similar effects have emerged from studies manipulating written instructional sets (e.g., Vansteenkiste et al. 2005). In general, research findings suggest that controlling behaviours and communications undermine autonomy relative to autonomy-supportive interactions.

Whilst there has been a considerable amount of research within SDT regarding the effects of social context on motivational state, need satisfaction and outcome measures such as well-being or behavior, little is known about how individuals cognitively process and respond to controlling or autonomy-supportive environments. A specific indicator of cognitive content that has received increased attention within the past decade is self-talk. Historically, a number of terms have been used to refer to self-talk including inner speech, internal dialogue, private speech, verbal rehearsal and egocentric speech (Depape et al. 2006). Private speech has been defined as overtly vocalized speech directed to oneself (Duncan and Cheyne 1999). In the present study self-talk was broadly conceptualized as a multidimensional phenomenon concerned with verbalizations addressed to oneself, either overtly or covertly (cf. Hardy et al. 2005).

Thus far, research examining antecedents of self-talk is relatively sparse, perhaps due to conceptual and measurement difficulties involved in investigating self-verbalizations (Meichenbaum and Butler 1979; Ericsson and Simon 1993). Some research has shown that self-talk can be predicted by task or environmental conditions, with individuals using private speech more frequently in more difficult tasks (Behrend et al. 1989). Such findings have been interpreted as support for the premise that self-talk predominantly serves a self-regulatory function (Ferryhough and Fradley 2005). Of greater relevance to the present investigation, the behavior of others has been related to individuals' self-verbalizations. Within an educational setting, Burnett (1999) showed that teachers' positive statements were associated with positive self-talk in their students. More recently, Zourbanos et al. (2006) found that coaches' negative activation behaviors including behaving inappropriately or in a distracting manner were directly related to athletes' thoughts of failure and negative self-talk.

Although social-contextual factors may directly affect the content or type of self-talk, it is also possible that self-talk may be actively used as a mechanism through which individuals make sense of and process their environment. Lawrence and Valsiner (2003) suggested that self-talk facilitates the interpretation and internalization of social messages, proposing a model by which individuals internalize and transform social messages through dialogue with themselves or imagined others. Additionally, self-talk has been shown to mediate the relationship between teacher feedback and changes in self-concept, with students using self-talk to respond to information from others and internalizing it whilst altering their perceptions of themselves (Burnett 2003). It may be that the type of self-talk used by individuals varies as a function of social communications/context, and that this in turn causes changes in motivational and affective states. If cognitions are fundamentally linked to behavior and emotion (Genest and Turk

1981), then studying individuals' cognitions in different social contexts may enhance our knowledge of the processes by which autonomy-supportive and controlling environments affect these variables.

Thus the aim of the present study was to examine the effects of autonomy-supportive and controlling environments on the nature and content of individuals' self-talk. Specifically, as research has shown that individuals in an autonomy-supportive environment report greater enjoyment, positive affect, satisfaction and psychological adjustment relative to controlling contexts (e.g., Cooper et al. 1995; Black and Deci 2000), it was hypothesized that self-talk produced under autonomy-supportive conditions would reflect a more autonomous form of behavioral regulation, through the use of more autonomy-reflective words (e.g., I can, I choose to) and fewer controlling words (e.g., I must, not allowed), compared to self-talk in a controlling condition. This would support previous findings that autonomous versus internally and externally controlling regulations can be manipulated by communication styles (Vansteenkiste et al. 2005), and that language used in self-talk can be modelled from others (Lantolf 2006). It was also hypothesized that differences in the number of first, second, and third person references would emerge, with individuals in a controlling environment making reference to an external controlling source or third party explicitly (e.g., you, it, they), and using less first-person references. In addition, Deci and Ryan (2000) proposed that controlling contexts can result in conflict, alienation, anxiety, and depression as well as controlling regulatory processes and compensatory goals. Therefore it was hypothesized that, relative to a controlling environment, self-talk produced in an autonomy supportive environment would include more expressions of positive emotions and fewer expressions of negative emotions. As research has shown that swearing is used to express negative emotions (Rassin and Muris 2005), it was also hypothesized that participants in the controlling condition would use more swear words. Finally, previous research has shown that intrinsic motivation for a novel task can be undermined by self-administered controlling, as opposed to informational, feedback (Ryan 1982). Therefore, it was hypothesized that participants in the autonomy-supportive condition would report greater interest and enjoyment of the task, less pressure and tension, and greater perceived choice, as indicated by a post-trial self report measure.

Methods

Participants

Seventy university students (16 male, 54 female) with a mean age of 24.19 ($SD = 9.07$) were recruited via sign-up

sheets during lectures and email advertisements. Participants were randomly assigned to one of two experimental groups, an autonomy-supportive or a controlling condition.

Measures

Self-talk

Participants' self-talk was recorded during a 10-min maze task using a 'think aloud' protocol. The 'think aloud' method of cognitive assessment has been used in a number of studies and typically produces a large quantity of verbal data compared to thought listing techniques (Blackwell et al. 1985). Thinking aloud involves participants continuously verbalizing thoughts as they enter awareness, without editing or explanation processes (Ericsson and Simon 1993). All self-talk was digitally recorded then transcribed verbatim for further analysis.

A self-talk measurement check based on Peters and Williams' (2006) measure was also included, which assessed the extent to which participants verbalized all their thoughts during the 10-min trial period. Participants marked a visual analogue scale which ranged from 0 (*not at all*) to 100% (*all the time*). Participants were also asked to list anything that they did not 'think aloud' in order to test for any differences in overt and covert self-talk between the conditions.

Manipulation check

It has been shown that when the need for autonomy is frustrated, the tendency for participants to engage in a task in a willing and volitional nature is reduced (Vansteenkiste et al. 2005). Therefore, to determine that autonomy-supportive and controlling environments had been successfully produced, a free-choice protocol was employed. A free choice situation involves recording the extent to which participants persist with a target activity (in this case the maze program) during a period subsequent to the experimental phrase, when the option of an alternative activity is provided (Deci et al. 1999). In addition, participants completed a task-specific version of Vansteenkiste et al.'s (2005) four-item measure of perceived autonomy (e.g., "I felt like it was my own choice to do the mazes"). Items were rated on a 5-point Likert-type scale ranging from 1 (*not at all*) to 5 (*very much*). Vansteenkiste et al. (2005) previously used this scale as a manipulation check and reported that it showed good reliability ($\alpha = .80$). Participants also completed interest/enjoyment, pressure/tension and perceived choice subscales adapted from the Intrinsic Motivation Inventory (Ryan 1982). Example items include "I found the task very interesting" (interest/enjoyment), "I felt tense while doing the task" (pressure/tension), and

“I felt that it was my choice to do the task” (perceived choice); all subscales were rated on a 7-point Likert scale ranging from 1 (*not at all true*) to 7 (*very true*). In line with previous findings (e.g., Deci et al. 1994; Ryan 1982; Vansteenkiste et al. 2005) it was expected that participants in the controlling as opposed to the autonomy-supportive condition would demonstrate less free-choice time activity as well as report lower interest/enjoyment, lower perceived choice and higher pressure/tension.

Procedure

Prior to informed consent being obtained, participants received an information sheet explaining that the purpose of the study was to examine the use of self-talk during problem solving activities, and were informed that testing would be audio and video recorded. The experimental trial consisted of a 10-min period during which participants were asked to ‘think aloud’ whilst attempting a series of computer-presented mazes in a laboratory environment. The mazes were selected as pilot testing had indicated that participants were able to produce an acceptable frequency of verbalizations whilst undertaking the task, and that the level of task difficulty was appropriate, in that it was moderately difficult. A moderately difficult task was sought as studies have shown that these conditions elicit the greatest frequency of self-verbalizations (Diaz 1992).

Prior to commencing the trial period, participants were introduced to the concept of thinking aloud, and completed practice activities such as those described by Ericsson and Simon (1993) [e.g., thinking aloud whilst working out the number of windows in your house]. Once the experimenter was satisfied that the participant had fully understood thinking aloud, participants received instructions regarding the experimental task. To create autonomy-supportive and controlling conditions an adapted version of Deci et al.’s (1994) protocol was used, in which social context was manipulated by the presence or absence of three experimenter-delivered factors; providing a meaningful rationale for the task, acknowledging feelings, and conveying a sense of choice. In the autonomy-supportive condition all three facilitators were present, whereas in the controlling condition none were present. The instructional sets for participants in the controlling condition focused solely on what the task entailed, for example participants were told what thinking aloud was, that they should complete a practice trial, what to do, and when and where to start. In the autonomy-supportive condition, the following rationale and acknowledgment of the participants’ potential negative feelings regarding the task were provided:

Doing this activity has been shown to be useful, as we have found that participants who have done it have

learned about their own concentration and problem solving skills. This has occurred because the activity involves focused attention, which is important in concentration. I know that doing this is not much fun; in fact many participants have told me that it’s pretty boring, so I can understand and accept that you might not find it very interesting.

The final factor, conveying a sense of choice, was altered by the language used by the experimenter in both the verbal instructions and the written instructional set provided. For example, the controlling group were told “I will first explain what you should do and I will tell you when to begin”, whereas the autonomy-supportive group were told “I will first explain what to do and you can decide when to begin”.

Once the 10 min trial had been completed, participants were informed that the experimenter had to leave to collect an additional questionnaire, and that they could continue working on the maze problems whilst waiting. General interest magazines were placed in the room so that participants were presented with a free choice situation. During a 5-min free choice period time spent on the activity was recorded using video surveillance. After 5 min had elapsed participants were asked to complete the set of previously described questionnaires and were then fully debriefed.

Data analysis

All recordings were transcribed verbatim then primarily analysed using the Linguistic Inquiry and Word Count (LIWC) program (Pennebaker et al. 2001). This lexical frequency software calculates rates of word usage for a range of categories including standard linguistic dimensions (e.g., first, second, and third person references) and more advanced conceptual categories such as affective or emotional processes (e.g., positive feelings: happy, joy, love) [see LIWC manual for more detail]. In the present study, the categories examined were positive emotions (e.g., happy, pretty, good), negative emotions (e.g., hate, worthless), first, second and third person references (labelled *self*, *you*, and *other* respectively within the LIWC dictionary), assents (positive assertions: e.g., yes, ok), negations (negative assertions: e.g., no, never), and swear words. A custom dictionary was developed in order to test for words that reflect controlling or autonomous self-talk (e.g., controlling: should, must, have to; autonomous: free, choose, could).

Additionally, transcripts were content analyzed to identify any differences in patterns of thoughts or phrases between the two conditions in order to allow a more in-depth understanding of the nature of self-talk used than word frequencies alone. Following a similar procedure to

Scanlan et al. (1989), inductive content analyses were carried out separately for self-talk from the autonomy-supportive and controlling conditions. Two researchers independently familiarized themselves with the transcripts and audio files and divided the data into meaningful units of analysis. Units ranged in length from single words to complete sentences and were defined as statements that were “self-definable and self-delimiting in the expression of a single, recognizable aspect of the subject’s experience” (Cloonan 1971, p. 117). Following this initial step any discrepancies were discussed until a consensus was reached.

Similar units were then clustered based on internal homogeneity and external heterogeneity, in order to identify raw data themes. Again, the two researchers conducted this process independently then any divergence was discussed until consensus was reached. Finally, the raw data themes were clustered into higher order themes through discussion which achieved consensual agreement. This was implemented as it allows a more thoughtful and more accurate conceptualization of the resulting clusters than more nomothetic interjudge agreement methods (Hill et al. 1997).

As recommended by Lincoln and Guba (1985), post-construction checks of ‘trustworthiness in the analysis’ were also conducted. First, a disinterested peer was asked to match the lower-order themes into higher order categories. The agreement rate was 100% which suggested that the rationale behind higher-order classification was logical and transparent. A form of member checking was also conducted, in which one participant from each experimental condition read the first order category labels given to units of self-talk and was asked to indicate whether the labels accurately reflected the content of the statements. Both participants agreed that labels were accurate and representative, with two minor modifications made; the category originally labelled ‘Motivational’ was relabelled ‘Encouraging’ and the category originally labelled ‘Attentional Focus’ was relabelled ‘Concentration/Focus’.

Results

Descriptive statistics

Cronbach’s alpha reliabilities for the questionnaire measures were as follows: interest/enjoyment = .94; pressure/tension = .87; perceived choice = .83; perceived autonomy = .89. Examination of skewness and kurtosis for the perceived autonomy subscale revealed that the assumption of normality was violated (skewness = 1.543, SE = .291; kurtosis = 1.957, SE = .574). Further examination revealed a restricted scoring range with only 4.2% of respondents reporting a mean score across the four items of ≤ 2

(possible scoring range = 1–5). Out of 280 possible responses (four items for each participant), the lowest scale point (1) was selected only 15 times. Taken together, this suggests that the scale did not adequately differentiate participants’ perceived autonomy, and it was subsequently eliminated from further analyses.

Bivariate correlations between the variables of interest are shown in Table 1. Interest/enjoyment and perceived choice were moderately positively correlated, and pressure/tension was negatively correlated with perceived choice. Time spent on the task during a free choice period was not significantly related to any of the self-report variables, nor to any self-talk categories. Frequency of assents and positive emotion words were strongly and positively correlated ($r = .814$), as were negative emotion words and swearing ($r = .906$). However, this was not considered problematic as the LIWC dictionary categorizations indicate that words included within each category are mutually exclusive and conceptually distinct.

Self-talk measurement check

The mean percentage of self-talk that participants reported verbalizing during the trial period was 73.1%. Participants listed a mean of 23.39 ($SD = 39.46$) words of covert self-talk, which equated to 5.2% of their overt self-talk. Although it is possible that some of the participants’ covert self-talk was unreported, or that participants were unable to accurately perceive how much they ‘thought aloud’, these findings do suggest that participants verbalised the majority of their self-talk. Due to non-normal distribution of participants’ reported covert self-talk, univariate non-parametric tests were used to identify any between-group differences. These indicated that there was no significant difference in the frequency of non-verbalized self-talk between the two conditions ($z = -.993$, $p = .321$), and no between-group differences in the content of participants’ covert self-talk on the categories relevant to the present study. Therefore, it was considered appropriate to examine differences in overt self-talk between conditions.

Autonomy support manipulation check

Independent samples t-tests revealed that participants in the autonomy-supportive condition ($M = 162.14$, $SD = 96.88$) spent significantly longer on the maze task during the free choice period as compared to their controlling condition counterparts ($M = 46.06$, $SD = 73.41$; $t = 5.11$, $p < .001$). Participants also reported significantly higher interest/enjoyment in the autonomy-supportive condition ($M = 5.16$, $SD = 1.23$) than those in the controlling condition ($M = 4.27$, $SD = 1.31$; $t = 2.93$, $p = .005$). Participants in the autonomy-supportive condition reported lower pressure/tension

Table 1 Means, standard deviations and bivariate correlations

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Interest/enjoyment	4.72	1.34														
2. Pressure/tension	3.24	1.41	-.13													
3. Perceived choice	5.89	1.08	.30**	-.30*												
4. Perceived autonomy	4.25	0.98	.23	-.28*	.76**											
5. Time free choice	106.48	105.49	.15	-.20	.00	-.04										
6. Autonomous ST	1.70	1.21	.13	-.01	.05	.01	-.10									
7. Controlling ST	0.71	0.57	.08	-.16	-.11	-.01	.01	.04								
8. 1st Person	7.22	3.10	-.38**	.26*	-.26*	-.11	-.02	-.06	.11							
9. 2nd Person	0.82	0.96	-.08	-.04	.07	.00	-.05	.18	-.10	-.297*						
10. 3rd Person	0.24	0.56	-.20	-.12	-.08	.00	-.13	.09	-.06	-.12	.33**					
11. Negations	2.72	1.49	.14	-.03	.02	-.07	-.03	.17	.20	-.19	-.17	-.24*				
12. Assents	1.94	1.75	.31**	-.30*	.15	.17	.11	.11	.12	-.31**	-.10	.17	.19			
13. Positive emotions	2.28	1.64	.19	-.32**	.08	.07	.08	.06	.10	-.31**	.00	.25*	-.01	.81**		
14. Negative emotions	2.36	1.94	-.02	.14	.03	.16	.01	-.13	-.20	.11	-.10	.01	.00	.01	-.12	
15. Swearing	1.11	1.70	.05	.14	.10	.14	-.12	-.09	-.15	.01	-.01	-.03	-.01	-.05	-.11	.91**

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

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

($M = 3.01$, $SD = 1.38$) than those in the controlling condition ($M = 3.46$, $SD = 1.43$; $t = 1.34$, $p = .184$), however, this was non-significant. There was no significant difference between the groups on perceived choice ($t = .451$, $p = .654$).

Self-talk variables

A discriminant function analysis was carried out to determine whether the two groups differed along the dimensions of self-talk identified by the LIWC analysis. The predictor variables included were those about which a priori hypotheses were made, that is positive emotions, negative emotions, first, second and third person references (*self*, *you*, and *other*), assents (positive assertions), negations (negative assertions), swear words, autonomous words and controlling words. This resulted in a total of 10 predictor variables. Table 2 shows the means, standard deviations and standardized discriminant function coefficients.

After the removal of multivariate outliers, the final sample size for this analysis was 65. Box's M was significant ($p = .002$) however, in line with the recommendations of Tabachnick and Fidell (2001), given that the group sizes were not notably different this was not considered problematic. Results revealed a significant discriminant function (Wilks' $\lambda = .632$, $\chi^2(10) = 26.61$, $p < .05$). Using the recommended cut-off of $>.30$ (Tabachnick and Fidell 2001), examination of the structure coefficient matrix identified that five self-talk categories contributed meaningfully to the discriminant function: Assents ($-.666$), Positive Emotions ($-.506$), Swearing (.415), Negative Emotions (.398) and Self (.381). The discriminant function resulted in the correct classification of 78.5% of participants; 78.1% from the controlling and 78.8% from the autonomy-supportive condition. Group centroid means were also examined as Tabachnick and Fidell (2001) state that if there is a large difference between group centroids along a discriminant

function then this provides additional evidence that the groups can be discriminated. Moreover if centroids are large and in the opposite direction, then group discrimination is more distinct (Biddle et al. 2001). In the present analysis the group centroid means were $-.740$ for the autonomy-supportive and $.763$ for the controlling condition.

Qualitative content analyses

Results from the final analyses are shown in Fig. 1. It can be seen from the figure that there was a great deal of consistency between the types of self-talk that emerged from each condition. Under both conditions, a total of 34 raw themes emerged which were ultimately clustered into four higher order categories, positive task focused speech, negative task focused speech, non-task focused speech, and non-self-directed speech. The latter category comprised statements that were not considered self-talk (e.g., asking the experimenter a question) and thus was not considered further. The content analyses revealed that participants from both conditions used all three general categories of self-talk. Similarity in participants' self-talk was also evident following examination of the more detailed lower order themes. When positively focusing on the task, participants in both conditions used self-talk to describe their situation, plan actions, provide feedback on their current performance, and instruct themselves. Conversely, when focused on the task in a negative manner, participants from both conditions used self-talk relating to the difficulty of the task, their dislike of the task, self-criticism regarding their progress, and feelings of being tricked or deceived (usually in relation to participants' suspicion that there was not a solution to the puzzle). Non-task focused speech encompassed self-talk relating to the participants' feelings, and also irrelevant thoughts, such as 'I wonder what I'm going to have for tea tonight'. Across these categories, there were three types of self-talk which

Table 2 Self-talk means and standardized discriminant function coefficients

Variable	Experimental condition				Structure coefficient
	Autonomy-supportive ($n = 35$)		Controlling ($n = 35$)		
	Mean	SD	Mean	SD	
Assents	2.64	1.78	1.14	1.12	-.666
Positive emotions	2.80	1.65	1.66	1.32	-.506
Swear	0.61	0.96	1.66	2.18	.415
Negative emotions	1.82	1.42	2.94	2.24	.398
First person	6.30	2.93	7.96	2.89	.381
Negations	2.93	1.49	2.57	1.37	-.168
Second person	0.72	0.87	0.94	1.04	.154
Controlling	0.65	0.54	0.77	0.58	.133
Autonomous	1.73	1.14	1.71	1.34	-.009
Third person	0.19	0.42	0.19	0.27	.006

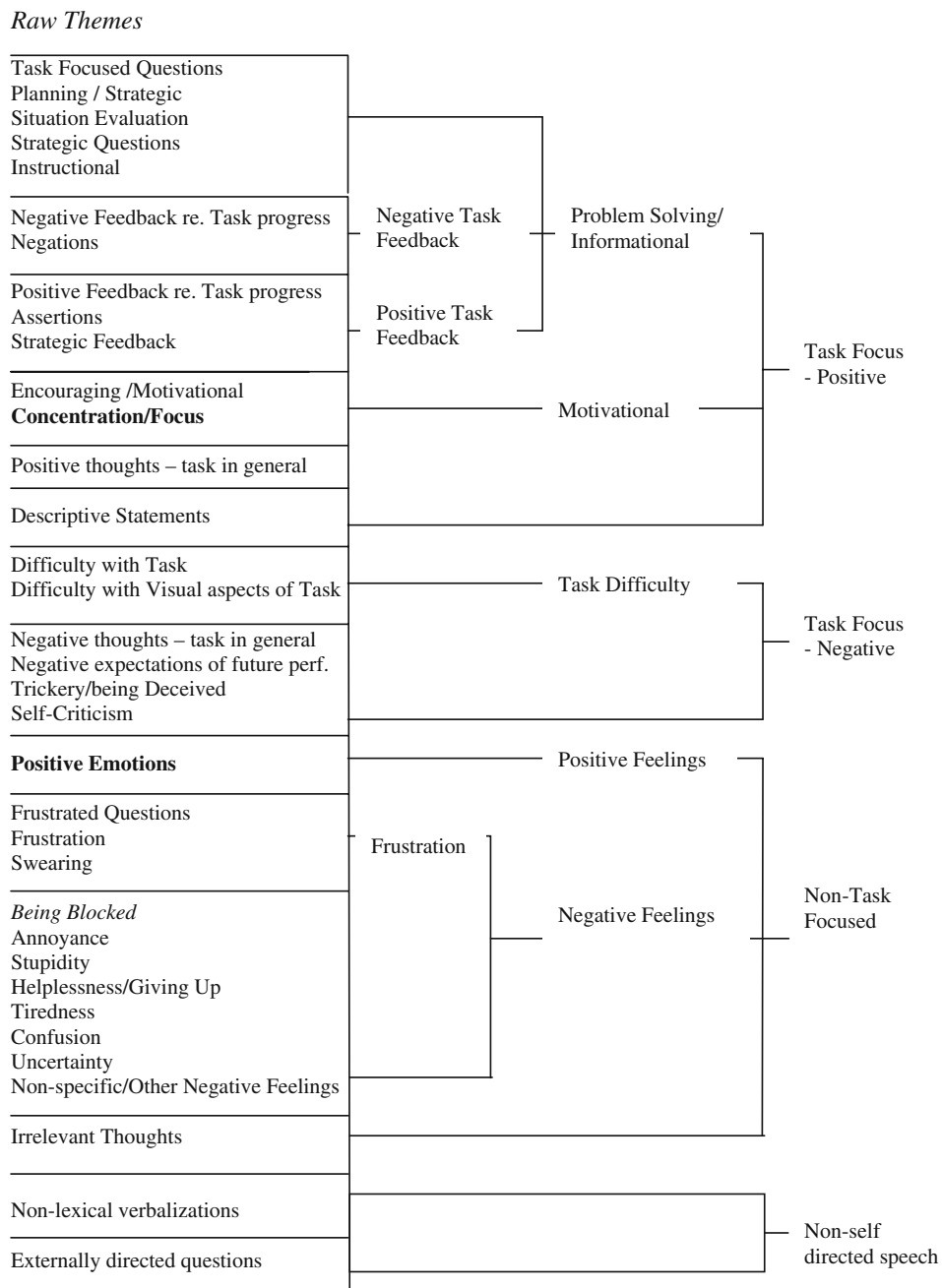


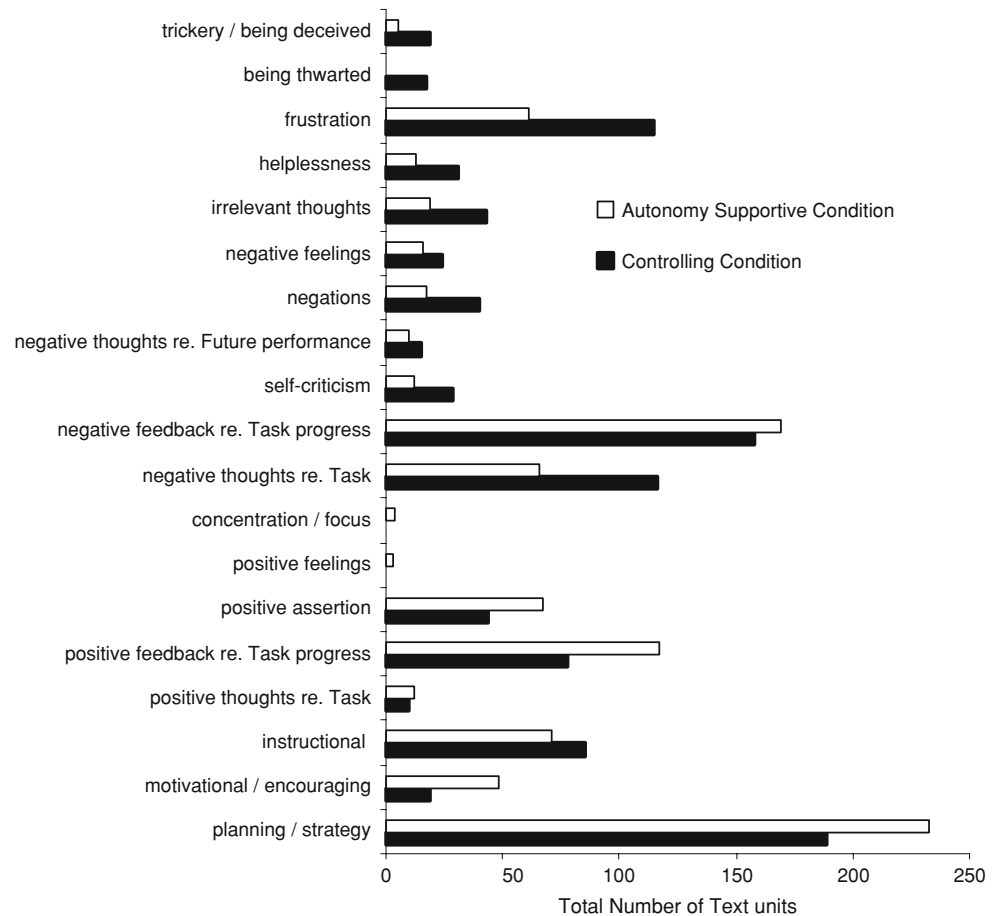
Fig. 1 Content analysis—higher order structure of self-talk units. *Note:* bold categories were unique to the autonomy-supportive condition; categories in italics were unique to the controlling condition

were unique to either the autonomy-supportive or the controlling condition; ‘concentration/focus’ and ‘positive feelings’ (autonomy-supportive condition only) and ‘being thwarted’ (controlling condition only). Concentration/focus encompassed phrases referring to increasing concentration and attention to the task, for example “keep your head on the game” and “ok, think, focus”. These phrases were considered semantically different from the more general encouraging/motivational category as they referred explicitly to enhancing task focus rather than overall

performance. The positive emotions category refers to self-talk in which participants stated their current feelings as positive, such as “this is exciting”. Finally, the category ‘being thwarted’ contained phrases which appeared to refer to an external agent restricting progress through the maze, such as “I just feel like I’m getting blocked everywhere I go”.

Examining the extent to which participants used categories of self-talk highlighted additional differences between the two conditions. It was noted whilst conducting

Fig. 2 Selective unit frequency comparison for autonomy-supportive and controlling experimental conditions



the analysis that although similar phrases had been used in both conditions, the extent to which participants used these differed. In a similar fashion to Zecevic et al. (2006), a unit frequency graph was compiled to further illustrate differences between the two content analyses (see Fig. 2). This shows a differing pattern in the frequency of self-talk content across the two conditions, in that fewer controlling or restrictive (e.g., explicit instructions, self-criticism) and more informative (e.g., feedback regarding task progress, planning) statements were used in the autonomy-supportive condition.

Discussion

The purpose of this study was to examine whether self-talk differed in autonomy-supportive and controlling environments. Importantly in the context of the present study the manipulation of social context through the use of instructional style appeared to be successful. Consistent with previous SDT-based research (e.g., Deci et al. 1994), participants in the controlling condition engaged in significantly less free-choice behavior and reported significantly lower interest/enjoyment for the task than those

in the autonomy-supportive condition. There was also a trend for participants in the controlling condition to report higher pressure/tension than those in the autonomy-supportive condition.

By analysing participants' self-talk data using both deductive quantitative and inductive qualitative approaches it was possible to conclude that differences existed between the two conditions that were predominantly consistent with the a priori hypotheses. Specifically, based on previous findings that controlling environments thwart need satisfaction, resulting in negative emotional consequences (e.g., Grolnick and Ryan 1987), it was unsurprising that participants' self-talk in the controlling condition contained more expressions of negative emotions and more swearing. Additionally, in the autonomy-supportive condition participants' enhanced enjoyment of the task was also reflected in greater use of positive emotion words and assents.

Contrary to expectations, participants in the controlling condition used more first-person references than the autonomy-supportive condition. It was anticipated that under autonomy-supportive conditions, participants would feel more able to express and endorse their own perspective in their self-talk. However, participants in the controlling condition more frequently verbalised negative emotions

and self-criticism, and from examining the transcripts it could be seen that these phrases commonly contained a personal element (e.g., “I don’t like doing this, I’m bored”; “I should be better at this, I’m rubbish”). It seems likely that participants’ negative emotional reaction to being controlled resulted in the production of more self-talk relating to their feelings. Alternatively, it is possible that participants’ self-talk may have been more purposeful than reactive, in that when autonomy was threatened, individuals may have attempted to buffer the effects of this control and reinforce the role of the self by emphasizing a personal perspective in their self-talk. The use of self-talk as a form of coping has been previously reported (e.g., Tamres et al. 2002), and in the present study this effect is in line with the principals of reactance theory (Brehm and Brehm 1981). Reactance theory proposes that perceived threats to the freedom of an individual can trigger a motivational state known as reactance, which leads to efforts to restore one’s freedom which may include problem-solving, rebellion, or cognitive distortion (Brehm and Brehm 1981; Deci and Ryan 1985). It is possible that the greater use of first person references reflected a state of reactance as a result of restrictions created by the controlling environment. However, given that second or third person references did not discriminate between the conditions, the mechanism underlying this finding requires further examination.

With respect to the LIWC data, it was also surprising that no differences were found between the two conditions regarding the use of words classified as controlling or autonomy-supportive. This could be due to the limitations of lexical frequency analysis programs in terms of their dependence on measuring the content of a word, rather than its meaning to an individual. For example, the phrase ‘You have to do this’ could be used as a ‘psyching up’ tool, and may be experienced as being autonomy-supportive and motivational by some individuals, whereas the same phrase could also be perceived as controlling or pressuring by others. Future research should focus on the meaning or functional significance of self-talk content to the individual in order to more appropriately evaluate its effects.

Finally, previous studies have reported differences in perceived choice between controlling and autonomy-supportive conditions (e.g., Vansteenkiste et al. 2005); however, no differences emerged in the current study. The mean scores for both conditions on this subscale were high, perhaps reflecting the voluntary commitment made by participants to engage in the experiment. Additionally, the responses indicating lower interest and enjoyment for the task and less time spent on the task during a free choice behaviour period in the controlling condition suggest that although participants may not have consciously perceived or explicitly recognised the environment as limiting choice or being controlling, they nevertheless experienced it as such.

Qualitative examination of the data complemented the findings of the quantitative analyses in that participants in the autonomy-supportive condition used more informational (e.g., feedback and strategic), more positive emotional, less controlling (e.g., instructional and self-critical) and less negative emotional self-talk than participants in the controlling condition. Moreover, positive emotions were only expressed by participants in the autonomy-supportive condition. Consequently, supportive evidence associating positive affect and well-being with autonomy-supportive environments was generated. Additionally, only participants in the autonomy-supportive condition used self-talk to regulate their concentration on the task. Evidence of self-regulation under autonomy-supportive conditions is consistent with the assertion that when autonomously engaged, individuals’ actions are self-organised rather than merely cued or prompted (Deci and Ryan 2000).

Under controlling conditions, the emergence of self-talk relating to a feeling of being thwarted by an abstract external entity is somewhat consistent with the hypothesis that more controlling environments induce an external perceived locus of causality (Reeve et al. 2003). It is possible that, when being controlled, participants were more likely to attribute progress on the task to external factors. Conversely, as from the experimenter’s observations this type of self-talk seemed to be used when participants were having difficulty with the task (i.e., when their chosen route was blocked or they could not find the correct path), it may be that when an external locus of causality is fostered, participants become more likely to blame others for their performance failings. Blaming others has been shown to be an avoidant coping style associated with external attributions for events (Clement and Schonnesson 1998).

Findings that participants in the autonomy-supportive condition used more informational and less controlling self-talk than participants in the controlling condition offer partial support to Lantolf’s (2006) proposition that self-talk is modelled from one’s social surroundings. It is plausible that, whilst specific words (e.g., should, must, have to) were not modelled in participants’ self-talk, more controlling conditions result in individuals adopting more restrictive types of self-talk (e.g., self-critical). It could also be argued that the pattern of self-talk that emerged from the two conditions bears some overlap with types of self-talk previously reported in the literature. In particular, in a study of tennis players Van Raalte et al. (1994) identified the use of positive motivational self-talk (e.g., ‘let’s go’) and instructional self-talk (e.g., ‘move your feet’) as well as negative self-talk which consisted of statements expressing frustration or a fear of failure (e.g., ‘oh God, that’s horrible’), and negatively expressed self-instruction

(e.g., ‘don’t hit it that way’). That similar categories of self-talk emerged within the current study suggests participants’ self-talk was reflective of that reported in natural settings.

When interpreting the results of the current study it is important to consider a number of limitations. Using verbalizations as data may have resulted in the non-reporting of some important types of self-talk, as it is inevitable that some form of thought editing will occur when participants think aloud. Although the finding of clear differences between the groups that were relatively consistent with the hypotheses suggests that measuring self-talk in the current manner did produce valid data, accurately measuring self-talk is an issue that requires further consideration. An additional limitation of the study is that although the inductive content analysis provided a more in-depth examination of the data available and provided some support for the quantitative findings, such a procedure has inherent weaknesses. Content analyses do not allow the identification of the most important or salient categories that emerge; for example, it may be that one of the less-frequent types of self-talk (e.g., self-criticism) is particularly salient to the individual’s experience. Furthermore, content analyses can be susceptible to subjectivity in terms of the researchers’ interpretation and classification of the data. The effects of this were minimized by conducting multiple independent analyses and following recommended guidelines for establishing trustworthiness (Lincoln and Guba 1985).

It could also be argued that the emergent differences in self-talk across the two conditions were primed by wording of the instructional sets, as opposed to a response to the generated social context. However, although the instructional set presented to the autonomy-supportive group contained a statement explicitly describing the task as “uninteresting” and “boring”, this group reported higher interest and enjoyment scores than the controlling group. Additionally, there was no implicit or explicit behaviourally-orientated prime within the instructions, and yet free choice behaviour differed between groups. Taken together, these findings suggest that the responses of participants could not solely be attributable to simple priming effects. Furthermore, with respect to the self-talk data, contrary to initial hypotheses no differences emerged in the use of autonomous and controlling words, as would be expected if differences in self-talk were driven solely by instructional priming effects.

Despite these limitations, the findings of this study have a number of important theoretical implications. As well as contributing to the limited body of literature examining antecedents of self-talk, this study highlights the influence of the social environment and interpersonal communication on cognitive processes. This supplements existing self-determination theory-based research which identifies the

impact of autonomy-supportive and controlling environments on need satisfaction, motivation, and emotional well-being by identifying that cognitive variables are also affected. This is important given the potential for cognition to influence affective state, motivation, and behavior. For example, as previous studies have identified positive relationships between positive self-talk and affective states (e.g., Hardy et al. 2001), effort (Wolters 1999), and performance (e.g., Behrend et al. 1989), the promotion of autonomy-supportive environments in order to maximize individuals’ use of positive self-talk is recommended. From an applied perspective, present findings offer some additional support for Amiot et al.’s (2004) proposition that autonomy-supportive coaching may foster the use of more adaptive task-focused forms of coping, which in turn predict athletes’ goal attainment and well-being. It is suggested that the informational and task-focused self-talk generated under autonomy-supportive conditions, in comparison to emotion-focused phrases under controlling conditions, might have beneficial effects on both coping and performance in a variety of domains.

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