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Control beliefs in cancer: A literature review

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The use of the control construct is widespread in research about chronic illness. Our aim was to analyse the relationship between perceived control and health outcomes in people with cancer. A search of databases (Medline, PsycINFO and Psicodoc) for articles published between 1966 and 2006 were conducted. Key words related to cancer, control beliefs and health outcomes were combined and searched resulting in the identification of 716 studies; 44 of the articles located met the criteria for inclusion in this review. The review showed that, firstly, self-efficacy beliefs had more power over patients' adaptation than the other belief constructs. Secondly, locus of control beliefs were the most frequently assessed beliefs in the 44 studies; however, there was a lack of association between locus of control and health outcomes. Internal locus of control was the dimension with the most positive relationship with emotional status and quality of life.
Key words: *control beliefs, cancer, systematic review, health outcomes.*

Creencias de control en cáncer: una revisión de la literatura

El control es un constructo ampliamente utilizado en las investigaciones sobre enfermedades crónicas en general. Nuestro objetivo fue analizar la relación entre el constructo de control percibido y los resultados de salud en cáncer. Hemos revisado los estudios publicados en las bases de datos Medline, PsycINFO y Psicodoc, el periodo de tiempo que abarcó la búsqueda fue entre 1966 y 2006. En el diseño de búsqueda introdujimos las palabras cáncer, creencias de control y resultados de salud. Se encontraron 716 estudios, 44 de los cuales se incluyeron en la revisión. La revisión muestra, en primer lugar, que las creencias de autoeficacia tienen mayor poder predictivo sobre la adaptación de las pacientes que

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otro constructo. En segundo lugar, las creencias de locus de control fueron las que más se utilizaron. El locus de control interno fue la dimensión que mostró mayores relaciones positivas con los resultados de salud.

Palabras clave: *creencias de control, cáncer, revisión sistemática, resultados de salud.*

Control Concept

The onset of chronic disease is an important source of stress that can lead to loss of control, helplessness and anxiety, and patients need to adapt to these types of experiences. Psychosocial factors (e.g. personality, social support, sociodemographic factors and cognitions) are important in facilitating people's adaptation. Perceived control has been found to be a particularly important psychosocial factor (Helgeson, 1992; Taylor, Lichtman & Wood, 1984; Thompson & Spacapan, 1991). Perceived control, efficacy and competence are related to a variety of positive effects in chronic disease including better well-being, increased motivation to carry out different behaviours, the use of coping strategies and positive personal adjustment outcomes (Helgeson, 1992; Lledó, 2005; Martín-Aragón *et al.,* 2000; Pastor *et al.,* 1999; Taylor, Lichtman & Wood, 1984; Thompson & Spacapan, 1991).

Despite the consistency of these findings, it is surprising to find heterogeneity among the constructs researchers use to describe control. Across the literature, a single term can be used to refer to very different constructs, making the integration of the results and investigation difficult. On the other hand, different labels are used for the same construct. This lack of clarity about control constructs has consequences for research findings, leading to theoretical confusion about the interrelationships among constructs and their relationships with health outcomes (Skinner, 1996).

Beliefs about control are part of many theoretical frameworks designed to explain behaviour and health outcomes. These theories employ similar but not identical operationalisations of perceived control and, the explanatory emphasis attached to the control beliefs depend on the particular theoretical framework.

Thus, in the *Theory of Planned Behaviour* (Ajzen, 1988, 1991), perceived control is conceptualised in terms of perceived behavioural control. It is defined as a person's expectancy that performance of behaviour is within their control, that is, their perception of how easy or difficult it will be to carry out the behaviour, including internal factors (information, abilities, emotions) and external factors (barriers, opportunities and dependency on other people). In the *Learned Helplessness Theory* (Abramson, Seligman & Teasdale, 1978; Seligman, 1972), perceived control is understood in terms of the debilitating effects on affect and task performance when there is a perceived lack of control. These effects are caused either because people believe that no connection exists between anyone's responses and a desired outcome (universal helplessness) or because they believe that their own, personal, ability is not sufficient to bring about the outcomes (personal learned helplessness). In *Protection Motivation Theory* (Rogers, 1975, 1983) the perception of control is defined in

terms of self-efficacy and expectations regarding the possibility that a certain behaviour can minimise or eliminate a threat. In *Self-Regulation Theory* (Leventhal, Nerenz & Steele, 1984) the perception of control (controllability in this case) is contemplated as an element that is part of people's mental representation of the illness. It refers to the anticipated and perceived responsiveness of the condition to self-treatment and expert intervention. In *Causal Attribution Theory* (Kelley, 1967; Weiner, 1985), control refers to people's beliefs about what caused the illness, and their attempts to understand why this has occurred. In *Social Learning Theory* (Rotter, 1954, 1966) and *Modified Social Learning Theory* (Wallston, 1992; Wallston, Wallston & DeVellis, 1978), perceived control is conceptualised in terms of locus of control, the degree to which a person thinks that an outcome is contingent upon their own behaviour, under the control of powerful others or chance. Finally, in *Social Cognitive Theory* (Bandura, 1977, 1987, 1997), perceived control is understood in terms of self-efficacy, which refers to a person's perceived ability to perform a particular task or behaviour to produce a desired outcome. All of these theories suggest a direct relationship between control beliefs, behaviour and health results.

Due to this heterogeneity of control's conceptualisation, it has been suggested that different terms should be used simultaneously, to enable an assessment of the relationships between control beliefs, behaviour and health outcomes. Moreover, it would also help investigators to make decisions about which control constructs are most likely to predict specific consequences in particular domains for people at different development levels (Skinner, 1992). In this sense, several reviews of the heterogeneous research into the control area have attempted to impose "order" on this myriad of constructs. Thus, many authors have generated a number of typologies to classify control beliefs (see table 1).

TABLE 1. CONTROL TYPOLOGIES (CLASSIFICATION ADAPTED BY BONETTI, 2000)

Authors	Typology
Averill (1973)	Identified three types of control: behavioural, cognitive and decisional.
Miller (1979)	Distinguished between decisional, instrumental, and potential control.
Thompson (1981)	Distinguished between behavioural, cognitive, informational and retrospective control.
Rothbaum *et al.* (1982)	Distinguished between primary and secondary control, and (within each) between control that is vicarious, illusory, predictive and interpretative.
Kuhl (1986)	Identified two types of control: real and perceived control.
Thompson & Spacapan (1991)	Described distinctions between the types of control, suggesting contingency versus competence control, primary versus secondary control and global versus specific measures of control.
Thompson & Collins (1995)	Described distinction between internal and external control, primary control versus secondary control and central control versus control related to consequences.
Skinner (1996)	Classified control constructs according to whether they were objective, subjective or experienced and whether their definitions referred to agent-end; agent-means or means-ends relations. Constructs can differ on the agents of control, means of control and outcomes of control, whether they refer to future or past experiences and whether they have specific or general domains as their referents.

Of all these typologies, the one that seems to categorise all conceptualisations of control is that detailed by Skinner (1996). She lists more than one hundred different conceptualisations which have been applied to the understanding of health-related behaviour, response to treatment and causal explanations of health-related events. Based on Skinner's review the best classification for gathering all of the types of control beliefs would be that which takes into account the different types of control in terms of agents, means and aims and the relationships among them. That is, the relationship *agents-means* refers to the extent to which a potential means is available to a particular agent (e.g. self-efficacy expectations). The relationship *agents-aims* is the prototypical definition of control, with control refering to the extent to which an agent can intentionally produce desired outcomes and prevent undesired ones (e.g. perceived control). Finally, the relationship *means-ends* refers to the connection between particular classes of potential causes and desired and undesired outcomes (e.g. Locus of Control).

Thus, control can be perceived either through an individual's own behaviours (personal control) or through other agents or means. The differences in the typologies provide some indication of the difficulties in conceptualising or operationalising the perceived control construct, suggesting that perceived control is a multidimensional construct, formed by different conceptualisations. Thus, different aspects of control do not necessarily have the same consequences over behaviour and health outcomes. Therefore, research using different control concepts to evaluate the influence on variables such as psychosocial adaptation, emotional states and self-care behaviours could reach different conclusions depending on which aspect of control has been measured.

Patients' control beliefs over the cause and evolution of their cancer are one of the psychosocial factors that facilitate patients' adaptation to their new situation. Patients need to create a sense of control regarding their illness, in other words, to perceive that they are able to obtain positive results and avoid the negative results. Moreover, these control beliefs are cognitive resources that are related to some coping strategies that allow patients to deal with different stressors associated with cancer and they influence patients' later adaptation. Furthermore, this sense of perceived control, efficacy or competence is associated with a variety of positive effects such as better well-being, increased motivation to carry out behaviours, use of coping strategies and good adaptation results (López Roig, Neipp, Pastor, Terol & Massutí, 2004; Neipp, 2005; Osowiecki & Compas, 1999).

In conclusion, and taking into account all of the above, it is necessary to know which control beliefs are used by cancer patients, and which control beliefs are related to patients' behaviours and adaptation to the illness. Therefore, we carried out a literature review of empirical studies that analysed relationships between control beliefs and health outcomes in cancer patients.

Control beliefs in cancer patients

A search of databases (Medline, PsycINFO and Psicodoc) for articles published between 1966 and 2006 were conducted. Key words related to can-

cer (cancer, oncology and neoplasm), control beliefs (based on the Skinner, 1996) review: Self-efficacy, Perceived Control, Health Locus of Control, Outcome expectancies, Causal Attribution, Perception of Control and Control Beliefs) and health outcomes (emotional status, quality of life, and adjustment) were combined for each control belief (i.e. "cancer or oncology or neoplasm and self-efficacy and quality of life") and searched; 716 studies were found. Inclusion criteria were that studies *(a)* had cross-sectional or longitudinal design; *(b)* examined the relationship between control beliefs and health outcomes; *(c)* were carried out with an adult cancer population; *(d)* measured control beliefs in diagnosis, treatment or follow-up stages; and *(e)* were written in English or Spanish. Forty-four of the articles located met these criteria and were included in this review. The remaining articles were excluded because they were theoretical articles, focused on prevention, promotion or screening programmes, used children or adolescent populations, focused on social support, or caregivers or were intervention studies focused on the effects of manipulating control beliefs.

The results were described according to the control construct studied in the samples of people with cancer. Locus of Control, Causal Attribution, Self-efficacy and Perceived Control have been found to be the most important control constructs in cancer research.

Locus of Control

Locus of control has been studied in 16 studies (table 2). Outcome variables assessed were psychological distress, well-being, quality of life and survival. When locus of control has been evaluated at a general level (instruments designed for general population; 4 studies), there is a lack of association between locus of control and outcome variables (Grassi, Malacarne, Maestri & Ramelli, 1997; Kreitler, Kreitler, Chaitchik & Shaked, 1997; Stanton & Snider, 1993). Only Grassi and Rosti's study (1996) found that the external dimension was associated with worse adjustment and high distress. Regarding Health Locus of Control (13 studies), results showed that it was related to different domains of quality of life (Blood, Dinee, Kauffman & Raimondi, 1993; Bremer, Moore, Bourbon, Hess & Bremer, 1997; Rondorf-Klym & Colling, 2003) and psychological distress (Andrykowski & Brady, 1994; Arraras, Wright, Jusue, Tejedor & Calvo, 2002; Grassi & Rosti, 1996; Tromp *et al.,* 2005). However, 5 of the 16 studies did not find relationships of health locus of control with outcome variables (Bourjolly, 1999; De Boer et al., 1998; De Valck & Vinck, 1996; Greimel, Padilla & Gran, 1997). Finally, one study that used an adapted instrument for a population of people with cancer (CLC) found that the three dimensions of the scale were related to adjustment to cancer (Watson, Greer, Pruyn & Van der Borne, 1990).

The Internal dimension of Locus of Control showed few associations with outcome variables, however, the relationships that did appear were those expected, such as significant and positive associations with well-being. These results are very similar to those found by Wallston (1992), stating that Locus of Control has very little predictive power over health outcomes. Rotter (1966)

TABLE 2. LOCUS OF CONTROL

Authors sample	*Design analysis*	*Dependent variables*	*Questionnaires* Locus of Control*	*Results***
Watson *et al.* (1990) n= 59 ≠ Diagnoses	Cross-sectional Correlation Analysis	MAC – Adjustment Fighting Spirit Anxious Preoccupation Helplessness Fatalism Denial HAD Depression/anxiety	CLC Internal Control over cause Internal Control over course Religious Control	(+) "Anxious Preoccupation" (+) "Fighting Spirit" ---- (+) "Fatalism"
Blood *et al.* (1993) n= 63 Larynx cancer	Cross-sectional Correlation Analysis	PAIS-SR Psychosocial Adaptation	MHLC Internal Chance Powerful Others	---- (+) Adaptation ---- (-) Adaptation ---- (-) Adaptation
Lowery *et al.* (1993) n= 195 Breast cancer Treatment	Cross-sectional Regression Analysis	PAIS Global Adaptation and Distress Subscale	MHLC-A Internal Chance Powerful Others	---- n.s. ---- n.s. ---(+) Global Adapt. ---(-) Distress
Stanton & Snider (1993) n= 147 Breast cancer Diagnoses	Longitudinal T1: 24 hours pre- biopsy T2: 24 hours pre-surgery T3: 3 weeks post-surgery Control Group. (Without cancer)	POMS – Distress, Vigour	Locus of control Internal External	---- n.s. ---- n.s.
Andrykowski & Brady (1994) n= 69 Leukemia Diagnoses	Cross-sectional Regression.	PHQ -- SEVERITY Index (functional status)	Internal Internal Chance	Internal Severity – (+) Distress Severity – (-) Distress --- n.s.
		POMS --- distress PAIS – distress DISTRESS	Powerful Others	Powerful Others ↑Severity – (-) distress ↓ Severity – (+) distress
			Powerful Others	11 Powerful Others ↓ Severity (+)distress ↑ Severity – (-)distress

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Authors sample	*Design analysis*	*Dependent variables*	*Questionnaires* Locus of Control*	*Results***
De Valck & Vinck (1996) n=16. Lung cancer Diagnoses	Longitudinal T1 : pre-diagnosis (HLC y DCCCP) T2 : 5 months post-diagnosis (DCCCP) Correlation	 DCCCP Quality of Life	HLC Internal External Internal External	T1 ---- n.s. ---- n.s. T1 – T2 ---- n.s. ---- n.s.
Grassi & Rosti (1996) n= 52 ≠ Diagnoses Diagnosis-Follow-up	Longitudinal T1: 3 months post-diagnosis T2: 6 years post-diagnosis Regression Multiple	 GSI Distress FS/H Adjustment	ELC External External	T1 ---- (-) Adjustment ---- (+) Distress T1 – T2 ---- (+) Distress
Bremer *et al.* (1997) n= 109 Breast cancer Follow-up	Cross-sectional Regression	IGA – general feeling about cancer ABS Positive feeling Negative feeling IWB – well-being	MHLC Internal Chance Chance (-) Powerful Others	 ---- (+) Positive feeling ---- (+) Negative feeling Positive feeling General feeling Well-being ---- n.s.
Grassi *et al.* (1997) n= 113 ≠ Diagnoses. Follow-up	Cross-sectional Regression Anal.	HDRS – Depression	ELC External	 ---- n.s.
Greimel *et al.* (1997) n= 227 ≠ Diagnoses. Treatment	Cross-sectional Regression	OMFQ and KPS Health status Treatment	MHLC Internal Chance Powerful Others	 n.s.
Kreitler *et al.* (1997) n= 96 Breast cancer Follow-up	Longitudinal T1: 3 years post-surgery T2: 5 years post-surgery Stage I – II Discriminant Analysis	Ad hoc Health status and survival	LC Internal External	T1 --- T2 ---- n.s. ---- n.s.

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Authors sample	*Design analysis*	*Dependent variables*	*Questionnaires* Locus of Control*	*Results***
De Boer *et al.* (1998)	Longitudinal T1: Treatment T2: 6 years post	Survival	MHLC-I Internal	T1 – T2 ---- n.s.
n=133 Head and neck cancer Treatment	COX Regression Analysis		CLC Internal control over cause	T1 – T2 ---- n.s.
Bourjolly, J.N. (1999)	Cross-sectional Regression	Social Function	MHLC Internal Chance Powerful Others	n.s.
n=122 Breast cancer Treatment				
Arraras *et al.* (2002)	Cross-sectional Regression	HAD – Anxiety /depression	MHLC-pain Internal Chance Fate Professionals	-- (-) Depression n.s.
n=51 ≠ Diagnoses Treatment				
Rondorf-Klym & Colling (2003)	Cross-sectional Path analysis	Quality-of-Life Scale Quality of Life	MHLC-I Internal	-- (+) Quality of Life
n= 88 Prostate cancer Treatment		CES-D --- Depression		-- n.s. Depression
Tromp *et al.* (2005)	Cross-sectional Correlation	HADS --- psychological distress	RHHI Internal External	--- (-) Distress --- (-) Distress
n=264 head and neck cancer Diagnosis				

*see end of table 5. for instrument's references
**n.s. no significant relationships; (+) positive relationship; (-) negative relationship

developed the term 'Locus of Control' for the prediction of health behaviours. This type of belief may only predict a measure of health if that measure of health is predicted by a behaviour of some sort. Rotter also proposed that people's expectations are based on previous experiences that influence their evaluation of health. Therefore, cross-sectional studies that find correlations between this belief and health status could be due to health status partially determining Internal

Locus of Control rather than the other way round. We have not found enough studies performing longitudinal designs to clarify this relationship and determine whether Locus of Control predicts health behaviour and adaptation to illness.

Regarding Chance Locus of Control, results are similar to those found by diverse investigations with chronic illness. These studies have shown that patients who perceived their health to be under the control of chance were less well adapted to the illness (Helgeson, 1992; Newsom, Schulz & Knapp, 1996; Thompson, Sobolew-Shubin, Galbraith, Schawnakovsky & Cruzen, 1993; Thompson & Spacapan, 1991). On the other hand, the relationship between the Powerful Others dimension and health outcomes is not so clear. In our review, the Powerful Others dimension appeared to be related either to better adaptation or worse adaptation (Andrykowski & Brady, 1994; Blood, Dinee, Kauffman & Raimondi, 1993; Lowery, Jacobsen & DuCette, 1993), and 4 studies did not find any relationships between them (Arraras, Wright, Jusue, Tejedor & Calvo, 2002; Bourjolly, 1999; Bremer, Moore, Bourbon, Hess & Bremer, 1997; Greimel, Padilla & Gran, 1997).

As described above, both the Internal and Powerful Others dimensions are predictors of good adaptation. Wallston, Stein and Graig (1994) proposed a combination of internal and external locus (in terms of the doctor's control), which might promote an adaptive profile in chronic illness. Research with other chronic diseases has also shown a locus of control profile constituting high scores in Internal and External Powerful Others control and low scores in External Chance control to be related to better adjustment in rheumatoid arthritis patients (Roskam, 1986) and diabetes patients (Bradley, Lewis, Jennings & Ward, 1990). In summary, as cancer patients have both internal and external control beliefs over their illness, to study different combinations of control beliefs rather than individual control beliefs might be more relevant in the investigation of control beliefs' impact on emotional and psychosocial adjustment in cancer patients.

Moreover, Wallston (1992) claimed that Locus of Control is only a small part of the global construct of perceived control. Locus of Control beliefs are necessary but not sufficient to perform health behaviours and predict health results. Therefore, it is suggested that it may be necessary to measure more than one conceptualisation of perceived control, otherwise study results may reflect the properties of the measure rather than the degree of prediction of health outcomes.

Causal Attribution

Seven studies used a Causal Attribution construct (see table 3) to conceptualise control beliefs when assessing the relationships between causal attribution, psychosocial adjustment and emotional status.

Results suggest that when patients attribute the cause of the illness to themselves, and they blame themselves, they have poor emotional status and poor adjustment to the situation (Berckman & Austin, 1993; Glinder & Compas, 1999; Houldin, Jacobsen & Lowery, 1996; Malcarne, Compas, Epping-Jordan &

Howell, 1995; Newsom, Schulz & Knapp, 1996; Watson, Greer, Pruyn & Van der Borne, 1990). But when patients attribute the cause of the illness to external factors, they also have poor adjustment and more distress (Berckman & Austin, 1993; Faller, Schilling & Lang, 1995). Thus, retrospective control beliefs, through both personal and external, could create a lack of sense of control in cancer patients. The results about internal causal attribution contradict other studies: either no significant association was found between self-blame and health status (Gotay, 1985; Taylor, Lichtman & Wood, 1984) or, when it was found, the relationship was positive (Timko & Janoff-Bulman, 1985).

TABLE 3. CAUSAL ATTRIBUTION

Authors sample	*Design analysis*	*Dependent variables*	*Questionnaires* Causal Attribution*	*Results***
Watson *et al.* (1990) n= 59 ≠ diagnoses	Cross-sectional Correlation Analysis	MAC–Adjustment Fighting Spirit Anxious Preoccupation Helpless/hopeless Fatalism Denial HAD Depression/ Anxiety	CLC internal Control illness cause	--- (+) "Anxious Preoccupation"
Berckman & Austin (1993) n= 63 Lung cancer Treatment-Follow-up	Cross-sectional Correlation Analysis	PAIS – Psychosocial Adjustment	ad hoc Internal External	(-) Social (-) Distress (-) Domestic (-) Domestic. (-) Distress (+) Sexual
Faller *et al.* (1995) n= 120 Lung cancer Diagnosis	Cross-sectional Covariance	FKV Depressive Coping Ad hoc – Distress D-S – Depression	ad hoc External	---- (+) Distress ---- (+) Depression
Malcarne *et al.* (1995) n= 72 ≠ Diagnoses Stage I – IV Diagnosis	Longitudinal Interview T1: post diagnosis T2: 4 months after Multiple Regression	BSI Version – Distress	ad hoc Behavioural Self-blame Characteriological Self-blame Characteriological Self-blame Interaction between behavioural and characteriological self-blame	T1 n.s. T1 – T2 ---- (+) Distress ---- (+) Distress

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Authors sample	*Design analysis*	*Dependent variables*	*Questionnaires* Causal Attribution*	*Results***
Houldin *et al.* (1996)	Cross-sectional	PAIS – Psychosocial Adjustment	ad hoc	
			Global Self-blame	(-) Psychosocial Adj.
	Regression			(-) Global Adjustment
n=234		GAIS –		
Breast cancer		Global Adjustment	Behavioural Self-blame	---- n.s.
Stage I and II				
			Characteriological Self-blame	---- n.s.
Treatment				
			Illness Cause	---- n.s.
Newsom *et al.* (1996)	Longitudinal T1: Interview T2 and T3 each 4 months	CES-D – Depression	ad hoc	T1
			Self-blame attribution	---- n.s.
n= 120				
≠ Diagnoses	Regression			T1 – T3
Recurrence			Self-blame attribution	---- (+) Depression
Glinder & Compas (1999)	Longitudinal T1 : diagnosis T2 : 3 months post-diagnosis T3: 6 months post. T4: 1-year post.	SCL-90 – Subscales Anxiety/depression	ad hoc	T1
			Behavioural Self-blame Characteriological Self-blame	(+) Anxiety/Depression
n= 76				
Breast cancer				T1 – T2
Stage I- IV			Behavioural Self-blame	----- n.s.
Diagnosis	Multiple Regression		Characteriological Self-blame	(+) Anxiety/ Depression
				T2 – T3 y T2 – T4
			Behavioural Self-blame Characteriological Self-blame	(+) Anxiety/ Depression
				T3 – T4
			Behavioural Self-blame Characteriological Self-blame	n.s.

*see end of table 5. for instrument's references

**n.s. no significant relationships; (+) positive relationship; (-) negative relationship

As we can see, the association between causal explanations and psychological adjustment is not very clear. On one hand, internal causal attribution can be adaptive: if patients believed that their situation is controllable, their own ability to deal with the illness and its consequences was enhanced (Berckman & Austin, 1993; Bulman & Wortman, 1977; Houldin, Jacobsen & Lowery, 1996; Janoff-Bulman, 1979). On the other hand, internal causal attribution can be maladaptive because it can generate feelings of guilt and low self-esteem (Abramson,

Seligman & Teasdale, 1978; Glinder & Compas, 1999; Malcarne, Compas, Epping-Jordan & Howell, 1995; Watson, Greer, Pruyn & Van der Borne, 1990; Weiner, 1985). Finally, this concept implies a contingent belief over illness cause, so it could be part of the Internal Locus of Control conceptualisation, however, each concept relates to a different illness stage. Internal Locus of Control would evaluate possible causes of the illness evolution (prospective perspective), and Causal Attribution would relate to the belief of the possible causes that initiated the illness (retrospective perspective).

Self-efficacy

Twelve studies used the self-efficacy construct to evaluate the relationship between self-efficacy and different outcome variables, such as emotional status and quality of life (see table 4).

Studies used either specific self-efficacy (e.g. symptoms management) or more general self-efficacy beliefs (e.g. stress reduction, enjoying life). Both types of beliefs were found to be related to patients' adjustment to cancer (Beckham, Burker, Lytle, Feldman & Costakis, 1997; Bekkers, Van-Knippenberg, Van-den-Borne & Van-Berge-Henegouwen, 1996; Cunninham, Lockwood & Cunningham, 1991; Lev & Owen, 1996; Lev, Paul & Owen, 1999). One of the studies found that specific self-efficacy predicted patients' survival (De Boer *et al.,* 1998), and other studies found negative correlations between self-efficacy and physical and psychological symptoms (Beckham, Burker, Lytle, Feldman & Costakis, 1997; Campbell *et al.,* 2004; Cunninham, Lockwood & Cunningham, 1991; Hirai *et al.,* 2002; Lev & Owen, 1996; Lev, Paul & Owen, 1999; Maliski *et al.,* 2004). Only three studies did not find significant correlations with outcome variables (Eton, Lepore & Helgeson, 2001; Penninx *et al.,* 1998; Ranchor *et al.,* 2002). General and specific self-efficacy beliefs also predicted better adjustment and emotional status over time (Bekkers, Van-Knippenberg, Van-den-Borne & Van-Berge-Henegouwen, 1996; Cunninham, Lockwood & Cunningham, 1991; Lev, Paul & Owen, 1999).

Results suggest that both general and specific self-efficacy beliefs are associated with better emotional status and better adjustment to cancer both in the short and long term. Other studies carried out with other chronic illness (such as chronic pain, diabetes mellitus and cardiac disease) also found that self-efficacy was related to better emotional status and better adaptation (Martín-Aragón *et al.,* 2000; Penninx *et al.,* 1998; Rosenbaum & Smira, 1986). It is worth noting that general self-efficacy beliefs were stronger predictors than specific beliefs on health outcomes. This might be because general self-efficacy is the belief in one's competence to manage novel tasks and to cope with adversity in a broad range of stressful or challenging events while specific self-efficacy is constrained to a particular task at hand (Schwarzer, 1992, 1994).

Despite their lesser powers of prediction, specific beliefs might contribute to the general sense of perceived personal control, through their effect on emotion. It is possible that to feel capable to deal with a particular aspect of the illness might produce tranquillity and a sense of control and this may have an

TABLE 4. SELF-EFFICACY

Authors sample	*Design analysis*	*Dependent variables*	*Questionnaires* Self-Efficacy*	*Results***
Cunningham *et al.* (1991) n= 273 ≠ Diagnoses Treatment	Longitudinal T1=273 T2= 6 weeks post T1 (255) T3= 3 months post T2 (204) Correlation	FLIC ---- Adjustment POMS --- Global Distress	SICPA Self-Efficacy to handle events GENERAL	T1 – T2 – T3 ---- (+) Adjustment ---- (-) Distress
Bekkers *et al.* (1996) n= 59 Colon and stomach Treatment	Longitudinal T1:1 week post-surgery T2: 4 months post. T3: 12 months post. Multiple Regression	PAIS-SR – Quality of Life	Stoma Self-efficacy Scale SPECIFIC Care Self-Efficacy Social Self-Efficacy Social Self-Efficacy	T1 – T2 ---- (+) Quality of Life ---- (+) Quality of Life T1 – T3 ---- (+) Quality of Life
Lev & Owen (1996) n= 64 ≠ Diagnoses Treatment	Cross-sectional Correlation	FACT – Quality of Life BSI – Psychological Symp-toms POMS – Mood States SDS – Distress	SUPPH Self-Efficacy to: GENERAL Enjoying Life Stress reduction Making decisions	 (+) Quality of Life (-) Psycho. Symptoms (-) Mood States (-) Distress --- (+) Quality of Life --- (-) Distress --- (-) Mood States
Beckham *et al.* (1997) n=42 ≠ Diagnoses Treatment	Cross-sectional Multiple Regression	CES-D – Depression ad hoc CAS – Cancer Adjustment Scale	SE Self-Efficacy over symptoms	 ---- (-) Depression --- (+) Adjustment
De Boer *et al.* (1998) n=133 Head and Neck cancer Treatment	Longitudinal T1: Treatment T2: 6 years post-treatment COX Regression	Survival Recurrence	Physical Self-Efficacy Scale SPECIFIC Self-Efficacy over physical abilities	T1 – T2 --- (+) Survival --- (-) Recurrence

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Authors sample	*Design analysis*	*Dependent variables*	*Questionnaires* Self-Efficacy*	*Results***
Penninx *et al.* (1998) n= 161 ≠ Diagnoses Treatment	Cross-sectional Regression	CES-D –Depression	Self-efficacy Scale Self-Efficacy to: Willing to initiate behaviour Persistence facing adversity Effort to complete behaviour	 ---- n.s. ---- n.s. ---- n.s.
Lev *et al.* (1999) n=124 ≠ Diagnoses Treatment	Longitudinal T2 : 4 months post T1 T3 : 8 months post T1 Canonical Correlations	FACT – Quality of Life POMS – Mood states SDS – Distress	SUPPH Self-Efficacy to: Enjoying Life	T1 – T2 (+) Quality of Life (+) Vigour/ activity (+) Physical wellbeing (-) Strain/ anxiety (-) Distress
			Making decisions Stress reduction	---- n.s. ---- n.s.
Eton *et al.* (2001) n= 256 Prostate cancer Treatment	Cross-sectional Correlation.	SF-36 -- Quality of Life	Self-efficacy (ad hoc) Control disease-related problems	 --- n.s.
Hirai *et al.* (2002) n= 85 ≠ Diagnoses Terminal	Cross-sectional SEM	HAD Anxiety and depression	SEAC Self-Efficacy to: Symptoms Coping ADL Affect regulation	 (-)Anxiety/depression
Ranchor *et al.* (2002) n=167 ≠ Diagnoses	Longitudinal T0 : pre-morbid T1 : 2 months post diagnosis T2 : 6 months post diagnosis T3 : 12 months post diagnosis Regression	GHQ 12 items – Psychological distress	Self-efficacy General Self-efficacy	 T1 – T3 -- n.s.

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Authors sample	*Design analysis*	*Dependent variables*	*Questionnaires* Self-Efficacy*	*Results***
Campbell *et al.* (2004) n=40 Prostate cancer Post-treatment	Cross-sectional Correlations	SF-36 (2 subscales were used): Physical Function Mental Health	SSCI Confidence to management symptoms	(+) Physical Function (+) Mental Health
Maliski *et al.* (2004) n=228 Protaste cancer Post-treatment	Cross-sectional G1: high self-efficacy (n=175) G2: low self-efficacy (n=53) Correlations	Symptom Distress Scale	PEPPI Confidence in ability to communicate with physician	-- G1 (-) Distress -- G2 (+) Distress

*see end of table 5. for instrument's references
**n.s. no significant relationships; (+) positive relationship; (-) negative relationship

effect over general adjustment. In fact, in some studies reviewed, specific self-efficacy was related to emotional adjustment. In this sense, Bandura (1986, 1997) claimed that control is only associated with stress reduction and decreased uncertainty if control is accompanied by an individuals' belief in their capacity to cope with and handle the situation. Thus, these beliefs, referring to specific characteristics of illness, had an effect on general emotional adjustment and this adjustment may have had an impact on more global health outcomes.

Perceived Control

Eleven investigations used the global construct of perceived control to evaluate the relationship between control beliefs, quality of life and emotional status. In all studies perceived control refers to people's perceptions about their personal control to obtain desires outcomes. In this section we will also introduce three studies that use the construct 'mastery' that refers to people's perception of their ability to interact efficiently with the environment (Pearlin & Schooler, 1978).

Results show few or no associations between perceived control, emotional status and psychosocial adaptation (see table 5). When relationships were found they were as expected, for example, perceived control was associated with better emotional status or less distress (Astin *et al.,* 1999; Newsom, Schulz & Knapp, 1996; Norton *et al.,* 2005; Osowiecki & Compas, 1998; Osowiecki & Compas, 1999; Thompson, Sobolew-Shubin, Galbraith, Schawnakovsky & Cruzen, 1993; Wasteson, Nordin, Hoffman, Glimelius & Sjöden, 2002). However, perceived control did not predict outcome variables over time, except in Astin *et al.*'s study (1999) in which perceived control predicted less depression and better adjustment 8 months after diagnosis (Carver *et al.,* 2000; Malcarne, Compas

TABLE 5. PERCEIVED CONTROL

Authors sample	*Design analysis*	*Dependent variables*	*Questionnaires* Perceived control*	*Results***
Padilla *et al.* (1992)	Cross-sectional	MQOLS-CA – Quality of Life	Mastery Scale	
N= 100 Gynaecol. Cancer Stage I and II Treatment	Regression		Mastery	-- (+) Quality of Life
Thompson *et al*. (1993)	Cross-sectional	CES-D --- Depression SCL-90 --- Anxiety and Depression Subscales	ad hoc	
N= 71 ≠ diagnoses Treatment	Regression		Emotions/symptoms	---- (-) Depression
			Medical treatment	---- n.s.
			Social relationships	---- (-) Depression
			Progression of disease	---- (-) Depression
			Global control	---- n.s.
Malcarne *et al.* (1995)	Longitudinal Interview	Version BSI – Distress	ad hoc	
N= 72 ≠ Diagnoses Stage I – IV Diagnosis	T1: post diagnosis		Progression	---- n.s.
	T2: 4 months after Multiple Regression		Recurrence	---- n.s.
Houldin *et al.* (1996)	Cross-sectional ANOVA	PAIS – Psychosocial Adjustment	ad hoc	
N=234 Breast cancer Stage I and II Treatment		GAIS – Global Adjustment	Perceived control	---- n.s.
			Progression of disease	---- n.s.
Newsom *et al.* (1996)	Longitudinal T1: Interview T2 and T3 each 4 months	CES-D – Depression	Items HLC, Items ad hoc, Items PSS	T1
			Symptoms/effects	---- (-) Depression
N= 120 ≠ Diagnoses Recurrence	Regression		Treatment	---- n.s.
			Illness course	---- (-) Depression
			Global Control	---- (-) Depression
				T1 – T3 n.s.
Baker *et al.* (1997)	Cross-sectional	CES-D – Depression POMS – mood state	Mastery Scale	
N= 437 ≠ Diagnoses Treatment	Regression		Mastery	(-) Depression (-) mood status (+) Vigour
Osowiecki & Compas (1998)	Longitudinal T1: Interview T2: 4 months	BSI --- Anxiety / Depression Ad hoc –Coping	ad hoc	T1
			Progression	---- n.s.
N= 62 ≠ Diagnoses Treatment	Regression		Progression X Coping	-- (-) Anxiety/ Depression
			Progression	T1 – T2 ---- n.s.

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Authors sample	*Design analysis*	*Dependent variables*	*Questionnaires* Perceived control*	*Results***
Penninx *et al.* (1998) N= 161 ≠ Diagnoses Treatment	Cross-sectional Regression	CES-D –Depression	Mastery Scale Mastery	 --- (-) Depression
Astin *et al.* (1999) N= 58 Breast cancer Diagnosis-treatment	Longitudinal T1: 6 weeks post-diagnosis T2: 4 months post- T3: 8 months post- Regression	FLIC --- Adjustment CES-D --- Depression SCL-90 --- Anxiety subscale	SCI negative assertive positive assertive desire for control negative yielding positive yielding negative assertive positive assertive desire for control negative yielding positive yielding ↑desire for control ↓ positive yielding ↑desire for control ↑ positive yielding ↑ positive assertive ↓ positive yielding ↑ positive assertive ↑ positive yielding	T1 n.s. --- (+) Adjustment --- (-) Depression T1 – T2 n.s. T1 – T3 (-) Adjustment (+) Adjustment (-) Adjustment (+) Anxiety/ depression (+) Adjustment (-) Depression
Osowiecki & Compas (1999) N= 70 Breast cancer Stage II Diagnosis	Longitudinal T1 : diagnosis T2 : 3 months T3 : 6 months Multiple Regression	CSI – Coping SCL-90-R – Anxiety/depression	ad hoc Symptoms Symptoms X Coping Symptoms	T1 ---- n.s. --- (-) Anxiety/ Depression T1 – T2 y T1 – T3 ---- n.s.
Carver *et al.* (2000) Study I N1=66 N2=78 Breast cancer Stage: I – II Diagnosis-Treatment	Longitudinal T1: post-surgery T2-T4: (3,6 and 12 months) Regression	POMS (N 1) Anxiety/Depression ABS (N 2) Anxiety/Depression/ Hostility	ad hoc Internal over recurrence External over recurrence	N1 y N2 T1 – T2 – T4 ---- n.s. ---- n.s.

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Authors sample	*Design analysis*	*Dependent variables*	*Questionnaires* Perceived control*	*Results***
Carver *et al.* (2000) Study II N1= 61 N2= 68 N3= 73 Breast cancer Stage: I – II Treatment	Cross-sectional N1 3 months post-surgery N2 6 months post-surgery N3 12 months post-surgery Regression	POMS – Distress CES-D – Distress 11 items – Quality of Life	ad hoc Internal Control over recurrence External Control over recurrence	N1, N2, N3 ---- n.s. ---- n.s.
Wasteson *et al.* (2002) N= 95 Gastroint. Cancer Treatment	Cross-sectional Correlation	HAD- Anxiety and depression	ad hoc Control over symptoms	--- (-) Anxiety and Depression
Norton *et al.* (2005) N=149 Ovarian cancer Stage: I-IV Treatment	Cross-sectional Equation models by EQS 5.7	MHI-18- Distress	Ad hoc Control over illness	--- (-) Distress

**n.s. no significant relationships; (+) positive relationships; (-) negative relationships

ABS (Affect Balance Scale; Bradburn's, 1969); ACA (Autoinforme de Creencias y Actitudes, Galdón *et al.*, 1997); BSI (Brief Symptom Inventory; Derogatis y Spencer, 1982); CLC (Cancer Locus of Control Scale, Pruyn *et al.*, 1988); CES-D (Center for Epidemiological Studies Depresion Scale; Radloff, 1977); CHLC (The Cancer Health Locus of Control; Dickson *et al.*, 1985); CS Log (The Coping Strategies Log; Dodd, 1984-88-88a); CSI (Coping Strategies Inventory; Tobin *et al.*, 1989); CECS (Courtauld Emotional Control Scale, Watson y Greer, 1983); DCCCP (Dutch Complaint Checklist for Cancer Patients; De Haes *et al.* 1983); D-S (Depressivitäts-Skala, Zerssen, 1976); ELC (External Locus of Control; Husaini *et al.*, 1981); FACT (Functional Impact of Cancer Treatment: Cella *et al.*, 1993); FKV (Freiburg Coping Questionnaire, Muthny, 1988); FLIC (Functional Living Index, Schipper *et al.*, 1984); GSE (General Self-efficacy, Spanish validation by Martín-Aragón *et al.*, 1997); HAD (Hospital Anxiety and Depression Scale, Zigmong and Snaith, 1983); HDRS (Hamilton Depression Rating Scale, Hamilton, 1960); HLC (Health Locus of Control Scale; Wallston *et al.,* 1976); IBQ (Illness Behaviour Questionnaire, Pilowsky and Spence, 1983); IGA (Index of General Affect; Campbell *et al.*, 1976); IWB (Index of Well-Bing; Campbell *et al.*, 1976); KPS (Karnofsky Performance Status, Karnofsky y Burchenal, 1949); LC (Locus of Control, Rotter, 1966); Locus of Control (Taylor *et al.*, 1984) LOT (Life Orientation Test, Sheier and Carver, 1985); MAC (Mental Adjustment to Cancer, Watson, Greer y Bliss, 1989); MHI -18 (Mental Health Inventory-18, Ware *et al.*, 1984); MHLC (Multidimensional Health Locus of Control Scale, Wallston *et al.*, 1978); MHLC-D (Pastor *et al.*, 1990); OMFAQ (Multidimensional Functional Assessment, 1978); PAIS, PAIS-SR (Psychological Adjustment to Illness Scale, Derogatis, 1986); PEPPI (Self-efficacy with the Perceived Efficacy in Patient-Physician Interaction, Maly *et al.*, 1998); PHQ (Perceived Health Questionnaire, Andrykowski *et al.,* 1990); Physical Self-Efficacy Scale (Ryckman *et al.*, 1982); POMS (Profile of Mood States, McNair *et al.*, 1981); PSS (Perceived Stress Scale; Cohen *et al.*, 1983); Quality-of-Life Scale (Burckhardt *et al.*, 1989); RHHI-24 (The Revised Health Hardiness Inventory, Gebhardt *et al.*, 2001); R-S (Repression-Sensitization Scale, Byrne, 1961); SCI (Shapiro Control Inventory, Shapiro, 1994); SCL-90R (Symptom Checklist-90-Revised, Derogatis, 1983); SDS (Symptom Distres Scale; McCorkle and Young, 1978); SE (Self-Efficacy Scale; Lorig *et al.*, 1989); Self-Efficacy Scale (Sherer *et al.*, 1982); SICPA (The Stanford Inventory of Cancer Patient Adjustment, Telch y Telch, 1986); STAI-R (Cuestionario de Anxiety Rasgo, Spielberger, 1970; TEA, 1982); Stoma Self-efficacy Scale (Bekkers *et al.*, 1994); SUPPH (Strategies Used by Patients to Promote Health; Lev y Owen, 1996).

Epping-Jordan & Howell, 1995; Newsom, Schulz & Knapp, 1996; Osowiecki & Compas, 1998; Osowiecki & Compas, 1999). Finally, the mastery construct was related positively to quality of life (Padilla, Mishel & Grant, 1992), and negatively to depression (Baker, Marcellus, Zabora, Polland & Jodrey, 1997; Penninx *et al.,* 1998).

The lack of significant results between perceived control and outcome variables could be due to the methodology used. The studies only used one or two questions when evaluating sense of control of patients, thus it is possible that this measure of the control construct was unreliable.

Conclusions

In this review we have described different taxonomies of control constructs. In each taxonomy, perceived control has a similar, but slightly different, conceptualisation. These varied conceptualisations may indicate the multidimensional nature of perceived control (Skinner, 1996; Thompson & Spacapan, 1991). Therefore, the relationship between perceived control and health status may be dependent upon the theoretical framework utilised. The conclusions we have reached in our review are the following:

Firstly, few studies which studied the relationship between control belief constructs and health outcomes were found. It is worth noting that only 25% of them were carried between 2000 and 2005, despite it being known that cognitive variables such as control beliefs are important in predicting better adjustment to chronic illness (López Roig, Neipp, Pastor, Terol & Massutí, 2004; Martín-Aragón *et al.,* 2001; Neipp, 2005; Pastor *et al*., 1999; Skinner, 1996). Therefore, more research is needed in order to explain the role of different control constructs in different phases of illnesses. It is also necessary to obtain data to examine other aspects of control that have not been studied in the context of chronic illness.

Secondly, self-efficacy beliefs had more power to influence patients' adaptation than the other belief constructs and those patients with higher self-efficacy beliefs had better quality of life and emotional status. This result supports the important role that Bandura gives Self-efficacy in his Social Cognitive Theory (Bandura, 1977, 1987, 1997).

Thirdly, locus of control beliefs were the most frequently assessed beliefs in cancer research as well as in other chronic illness conditions such as chronic pain (Martín-Aragón *et al.,* 2000). However, there was a lack of association between locus of control and health outcomes. Internal health locus of control was the dimension with the most consistent relationship with health outcomes, although the nature of the association depended on the time frame to which the internal dimension referred. In other words, if the internal dimension was understood as having prospective perspective on control (internal health locus of control) it was related to better emotional status and adaptation of cancer patients. However, if it was understood as having a retrospective perspective on control (causal attribution), it was related to more distress and worse adjustment. Regarding internal locus of control, Wallston (1992) made a modification of

Social Learning Theory, claiming that Locus of Control is only a small component of the construct of perceived control. Other forms of control are necessary in order to predict changes in health status and behaviour. Hence, he referred to the construct of health perceived competence as a more powerful predictor than internal locus of control because this construct combines a behavioural expectancy with outcome expectancies without the ambiguity of the locus of control. However, this construct has not been utilised in samples of people with cancer. Finally, studies that used non-standard questions designed to assess perceived control found very few associations with health outcomes.

We have tried to think about the role of control beliefs on cancer patients' adaptation. It is difficult to generalise the results due to the different types of control constructs used. Few studies were found that employed more than one concept to assess perceived control. It is suggested that if perceived control is a multidimensional construct, measurement of each dimension may be required to assess fully the influence of control beliefs on patients' adaptation to illness (Skinner, 1996). Further research analysing more than one control construct is necessary to study control beliefs' capacity to predict health outcomes and to investigate relationships between different control beliefs.

In view of the findings from this review, intervention programmes for patients with cancer need to incorporate skills to help these patients increase their sense of self-efficacy and competence to deal with stressful situations. Personal control over specific aspects of their cancer development and treatment need to be made available for these patients. Bárez *et al.* (2003) carried out a review of psychological intervention studies and their results support the idea of the importance of inducing feelings of control by psychological interventions in cancer patients in order to enhance patients' well-being.

Finally, it is important that health professionals are perceived by their patients as reliable and efficacious, as source of external control over the illness. A study of women with breast cancer in the follow-up phase confirmed this idea (Neipp, 2005): results suggested that to give control and calmness to women with breast cancer, numerous tests are not needed; rather, it is much more important that professionals offer an image of efficacy and accuracy.

A limitation of this review is that a meta-analysis, the current standard for this type of report, has not been performed. However, we have carried out a narrative interpretation of coefficients because the data available in many papers did not allow for a quantitative research synthesis. The interpretation of coefficients has been systematic and give readers as accurate a view as possible of how control beliefs affect health outcomes in cancer patients.

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