

# The role of trait emotional intelligence in the diagnostic cancer pathway

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## Abstract

**Purpose** Trait emotional intelligence (trait EI) has been linked with psychological outcomes in a variety of settings; however, it has received little attention in the healthcare field. We investigated the relationship between trait EI and worry at different stages of the diagnostic cancer pathway. **Methods** We recruited 64 individuals attending an outpatient urology cancer investigation. Patients completed the Hospital Anxiety and Depression Scale, Trait Emotional Intelligence Questionnaire—Short Form and a single-item measure of arousal/pleasantness. Worry was assessed retrospectively for each stage of the pathway and concurrently for the stage of ‘awaiting the specialist’. **Results** Trait EI was negatively associated with worry in the early stages of the diagnostic pathway (‘deciding to see’ and

‘awaiting the general practitioner (GP)’;  $p < 0.05$ ) and was negatively linked to patients’ worry while ‘seeing the GP’ ( $p = 0.051$ ) after controlling for anxiety, depression, arousal and pleasantness.

**Conclusion** Low trait EI is predictive of increased worry levels in the early stages of the diagnostic cancer pathway. Individual differences in trait EI should be considered when communicating medical results to patients and in the development of interventions designed to reduce worry levels in patients entering the diagnostic cancer pathway.

**Keywords** TEIQue-SF · Trait emotional self-efficacy · Worry · Anxiety · Depression · Cancer

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## Introduction

Cancer populations constitute a group at risk of impaired psychological well-being, with approximately 35% of individuals experiencing distress at some stage of their cancer experience [1]. Psychological illness, such as anxiety and depression, is underdiagnosed in cancer patients [2, 3], leaving them vulnerable to adverse outcomes, such as intrusive cognitions [4], fatigue [5, 6], delayed return to work [7] and impaired quality of life for themselves [8] and for their partners [9].

Zabora and colleagues [1] suggested that a patient’s initial adaptation to a cancer diagnosis can be influenced by social support, past psychological history, current concerns (e.g. work and finance) and sociodemographic factors, like education. Recently, researchers have started to investigate the role of individual differences in psychological outcomes among cancer patients, with evidence to suggest that patients’ personality characteristics of neuroticism [10], hostility [11] and optimism–pessimism [12] may be strong

predictors of adverse psychological outcomes in the longer term. Identifying individual differences that reduce or increase a patient's risk of psychological impairment is essential for informing theory-driven psychological interventions targeted at high-risk cancer patient groups.

Trait emotional intelligence (trait EI) is defined as 'a constellation of emotional self-perceptions located at the lower levels of personality hierarchies' [13]. In lay terms, trait EI concerns an individual's self-perceptions of their emotional abilities. The construct has been extensively researched in various contexts such as behavioural genetics [14], heart rate variability [15] and alcoholism [16]. A recent meta-analysis based on nearly 20,000 participants confirmed that trait EI is a strong predictor of mental health broadly defined [17]. Trait EI theory provides a robust scientific framework within which to explore how individuals experience, process and evaluate emotions. It, therefore, offers a scientific and clinically relevant framework for the evaluation of patients' emotional reactions to their experiences during healthcare episodes.

To date, trait EI has received little attention in the patient well-being literature. A notable exception is a study completed by Smith and colleagues, which demonstrated increased levels of anxiety (i.e. current levels of general worry, tension and apprehension [18]) and stage-specific worry (i.e. concerns and unease in relation to certain stages of the diagnostic pathway) among low trait EI individuals attending for a urological cancer investigation [19]. This association was maintained after controlling for perceived social support, which was found to have no effect on either patients' worry or anxiety. Interestingly, Smith et al. [19] found a strong association between trait EI and perceived social support, thereby suggesting a possible mechanism through which trait EI could influence stage-specific worry, as well as affecting psychological well-being more broadly through its influence on anxiety. However, that study did not attempt to measure levels of worry at the earlier stages of the patient's experience. In the UK, patients must first make an appointment with their general practitioner (GP; the equivalent of a community physician in the USA), wait for that appointment and attend it before they can be referred to see a specialist. Previous research has shown several distinct stages at which a patient's levels of worry could be elevated, including the stage at which one learns that a biopsy is required and waiting for the results of the biopsy [20].

Individuals in the pre-diagnostic stages of the cancer pathway (i.e. when they are waiting to be referred to a specialist) may be at risk of impaired psychological well-being, as they fear the prospect of intrusive investigations, painful treatment-related side effects and the possibility of a terminal diagnosis [21]. Small increases in worry are understandable and indeed sometimes justified in a cancer context. Furthermore, it has been argued that failure to express such emotion due to environmental constraints or other reasons can be detrimental

to psychological adjustment [22, 23]. However, for the majority of individuals in a pre-diagnostic context, excessive worry could be considered unnecessary due to the very low likelihood of the aforementioned aversive outcomes. For example, urology patients currently enter the diagnostic cancer pathway on the basis of signs and symptoms that have a low positive predictive value for cancer (e.g. high prostate-specific antigen [PSA] level). Successful identification, therefore, requires a large number of low-risk individuals to be investigated in order to identify a small proportion of individuals with the disease [24].

Objectively, this suggests that a diagnostic referral should not cause excessive worry. However, the reality is that the diagnostic pathway precipitates psychological impairment in men [19, 20]. It is, therefore, argued that the psychological well-being of pre-diagnostic urology patients could be monitored, particularly if it precipitates more serious psychological impairments for the small number of individuals that continue to the later stages of the pathway.

This study builds on our previous work by assessing the associations between trait EI and worry throughout the diagnostic cancer pathway [19, 20]. The key hypothesis that is being tested is that trait EI will be negatively related to worry throughout the diagnostic urological cancer pathway.

## Materials and methods

### Patients and procedure

Patients from a London (UK) hospital who had been urgently referred within 2 weeks of an appointment with a GP for either a bladder or prostate investigation due to the presence of cancer-related signs and symptoms were invited to participate in the study. Patients attending for a prostatic biopsy were assessed using a digital rectal examination, PSA testing and trans-rectal ultrasound within one appointment. Patients attending for a bladder investigation (flexible cystoscopy) underwent a local anaesthetic prior to their procedure, which entailed a small fibre optic tube being inserted into the urethra and passed through to the bladder.

Sixty-four patients were recruited in total, of whom 36 (56.3%) were attending for bladder investigation and 28 (43.8%) were attending for prostate investigation. The mean age of the patients was 64.55 years and, as a result of the clinical symptoms, 70.3% were male. The study was approved by the local National Health Service (NHS) ethics committee as an audit of clinical services prior to data collection.

### Measures

Trait EI was assessed using the Trait Emotional Intelligence Questionnaire—Short Form (TEIQue-SF). The TEIQue-SF

comprises 30 items that capture global trait EI and it is derived from the full form of the TEIQue, which covers 15 distinct emotion-related facets [25]. The TEIQue-SF includes 2 items from each of these 15 facets [26]. Participants respond to each item on a seven-point Likert scale anchored at ‘completely disagree’ and ‘completely agree’. Scores ranged between 30 and 210 (or 1–7 when normed), with higher scores indicating higher trait EI. The TEIQue-SF has been found to provide valid, reliable and rapid assessment of individual differences in global trait EI in the general population [27]. It correlates with healthy participants’ emotional experiences and how they cope with them [28], and it has been recently used successfully within cancer care settings [19]. In the present study, the TEIQue-SF was completed prior to the appointment with the specialist. Cronbach’s alpha within this sample was  $\alpha=0.83$ .

Anxiety and depression were assessed using the Hospital Anxiety and Depression Scale (HADS), which was developed to assess the levels of ‘caseness’ (i.e. need for psychological intervention) in anxiety disorders and depression in non-psychiatric hospital clinics [29]. It is composed of a seven-item anxiety sub-scale (HADS-A) and a seven-item depression sub-scale (HADS-D). Possible scores range from 0 to 21, with higher scores indicating higher anxiety or depression; a score above 11 is taken to indicate ‘caseness’ [20]. The HADS was completed prior to the appointment with the specialist. Cronbach’s alphas within this sample were  $\alpha=0.65$  and  $\alpha=0.64$  for the anxiety and depression sub-scales, respectively.

Worry at different stages of the diagnostic process was assessed prior to the appointment using 100 mm visual analogue scales (VAS). Possible scores ranged from 0 to 10, with higher scores indicating higher levels of worry. Following Awsare et al. [20], the diagnostic pathway was broken down into the following stages: deciding to see the GP, awaiting to see the GP, seeing the GP and awaiting to see the specialist. Patients completed the same worry measure immediately after their appointment, with the addition of an extra stage (seeing the specialist). In other words, patients were requested retrospectively to indicate their levels of worry during each stage of the diagnostic pathway, before as well as after seeing the specialist.

A validated single-item scale [30] was used as a brief index of pleasant–unpleasant emotions and high arousal–sleepiness prior to the appointment and immediately afterwards. Patients were asked to rate their mood as it was at that moment by placing a single mark in a  $9 \times 9$  matrix (see [ESM 1](#)). Emotional labels are located at the extremities of the affect grid. For example, ‘relaxation’ is located next to high pleasantness and high sleepiness, whereas ‘stress’ is located next to high unpleasantness and high arousal. Mood was assessed so that it could be used as a covariate in the statistical analyses.

## Statistical analyses

The unequal and comparatively small sample sizes necessitated the use of a relatively simple analysis with particular emphasis on undue influence from potential outliers. Paired-sample *t* tests were used to compare mean scores on arousal, pleasantness and worry between pre- and post-appointment. Repeated-measures analysis of variance was used to assess variation in worry scores throughout the diagnostic pathway. Greenhouse–Geisser estimates of sphericity were used where the assumption was violated. We calculated bivariate correlations between trait EI and the key variables in the study (worry during the five stages of the pathway: deciding to see, awaiting to see and seeing the GP, as well as awaiting and seeing the specialist). All correlations were subjected to a bivariate outlier analysis with a 95% confidence interval [31]. Multivariable regression analyses were conducted, whereby trait EI, HADS-A, HADS-D, pleasantness and arousal were used to predict patients’ worry at each stage of the cancer diagnostic pathway. The ‘enter’ method was used in all multivariable regression analyses (i.e. all predictors were entered simultaneously into the model).

## Results

### Anxiety, depression and worry

Sixty-three patients completed the HADS. Mean levels of anxiety were 8.25 (SD=3.58), with 19% of the sample meeting the ‘caseness’ threshold for clinical levels of anxiety. Mean levels of depression were 6.06 (SD=3.33), with 7.9% meeting the ‘caseness’ threshold for clinical levels of depression.

Table 1 shows the descriptive statistics (means, standard deviations [SDs]) of the key variables in the study. Worry

**Table 1** Means and SDs for the key variables in the study

	Pre-appointment		Post-appointment		Significance
	Mean	SD	Mean	SD	
TEIQue-SF	143.17	22.62	–	–	–
HADS-A	8.25	3.58	–	–	–
HADS-D	6.06	3.33	–	–	–
Pleasantness	3.76	2.57	5.69	2.78	0.002
Arousal	5.75	2.61	5.10	2.49	0.361
Deciding to see GP	4.06	3.06	3.58	3.20	0.075
Awaiting GP	3.44	2.98	3.42	3.11	0.332
Seeing GP	3.82	2.70	3.66	2.81	0.297
Awaiting specialist	5.70	3.11	5.16	3.14	0.040
Seeing specialist	–	–	5.17	3.09	–

scores were low to moderate throughout the diagnostic pathway. Worry was highest at the stages of ‘awaiting the specialist’ (as recorded both pre- and post-appointment) and ‘seeing the specialist’. Overall, there was a significant variation in worry reported throughout the diagnostic pathway as recorded at both pre-appointment ( $F_{(2.52, 156.09)}=18.58, p<0.001$ ) and post-appointment ( $F_{(1.9, 87.42)}=20.31, p<0.001$ ). Pleasantness scores increased significantly between pre- and post-appointment ( $t(46)=-3.21, p<0.01$ ), while there was no significant difference in arousal scores between pre- and post-appointment ( $p>0.05$ ).

### Correlations with trait EI

Trait EI was negatively associated with worry throughout the diagnostic pathway, particularly with ratings obtained prior to seeing the specialist (see Table 2). The strongest correlations were with self-rated worry ‘while seeing the GP’ (obtained before seeing the specialist) and while ‘awaiting to see the GP’ (obtained after seeing the specialist). Following the appointment, trait EI was no longer associated with worry at the ‘awaiting specialist’ or ‘seeing the specialist’ stages (both  $p>0.05$ ).

### Regression models

Models including trait EI, pleasantness, arousal, HADS-A and HADS-D accounted for a significant proportion of variance in patients’ worry throughout the diagnostic pathway (see Tables 3 and 4). At both pre- and post-appointment stages, trait EI was negatively associated with worry when ‘deciding to see the GP’ ( $\beta=-0.28$  and  $\beta=-0.32$ , respectively;  $p<0.05$ ) and while ‘awaiting to see the GP’ ( $\beta=-0.25$  and  $\beta=-0.30$ ;  $p<0.05$ ). Further, a significant negative relationship was obtained between trait EI and seeing the GP, but only when this was recorded prior to the appointment ( $\beta=-0.21$ ;  $p=0.051$ ). Trait EI was not incrementally associated with worry while ‘awaiting to see the specialist’

( $\beta=-0.18$  and  $\beta=-0.21$ ;  $p>0.05$ ) or while ‘seeing the specialist’ ( $\beta=-0.12$ ;  $p>0.05$ ). There were also no significant predictors of worry while ‘awaiting the specialist’ prior to the appointment (all  $p>0.05$ ). However, in the post-appointment model, pleasantness was negatively associated with worry ( $\beta=-0.49$ ;  $p<0.01$ ) and HADS-A was positively associated with it ( $\beta=0.36$ ;  $p<0.01$ ). These same variables were also significantly predictive of worry while ‘seeing the specialist’ ( $\beta=-0.49$ ;  $p<0.01$  and  $\beta=0.32$ ;  $p<0.05$ , respectively).

### Discussion

Trait EI was negatively correlated with worry across the early stages of the diagnostic cancer pathway in this sample of urgently referred urology outpatients. High levels of anxiety and moderate levels of depression as measured by the HADS were also observed. Worry scores were generally low to moderate and were highest while awaiting and seeing the specialist. The fact that the relationship between trait EI and worry remained statistically significant in the presence of other predictors like anxiety and pleasantness (an antonym of worry) is testament to the construct’s major relevance in mental health (see [17]) and its ability to explain variance beyond a multitude of other variables (see also [31, 32]).

Moderate levels of anxiety and depression were observed, as indicated by both mean scores and number of individuals meeting the ‘caseness’ criteria. These levels are markedly higher than normative estimates from the British population [33], confirming that this patient group is indeed at risk of psychological impairment. It should, however, be noted that previous assessments of this patient population using the HADS found anxiety and depression to be less prevalent than in our sample [20].

Our findings highlight a potentially fruitful avenue for future research in the areas of patient counselling and

**Table 2** Correlations between trait EI and worry

Outcome	Correlation	Sample size	Outliers
Ratings before seeing the specialist			
1. Worry when deciding to see the GP	-0.33**	60	–
2. Worry while waiting to see the GP	-0.31**	60	–
3. Worry while seeing the GP	-0.41***	56	13, 24, 28, 32, 57
4. Worry while waiting to see the specialist	-0.32*	57	22, 26, 64
Ratings after seeing the specialist			
1. Worry when deciding to see the GP	-0.44***	41	24, 28, 32, 33, 57
2. Worry while waiting to see the GP	-0.47***	40	24, 28, 32, 33, 39, 57
3. Worry while seeing the GP	-0.27*	43	28, 33, 57
4. Worry while waiting to see the specialist	-0.19	46	–
5. Worry while seeing the specialist	-0.15	44	13

\* $p<0.05$ , \*\* $p<0.01$ ,  
\*\*\* $p<0.001$

**Table 3** Regression of pre-appointment worry variables onto Trait EI, pleasantness, arousal, HADS-A and HADS-D ( $N=59$ )

	Deciding to see GP		Awaiting GP		Seeing GP		Awaiting specialist	
	$\beta$	$t$	$\beta$	$t$	$\beta$	$t$	$\beta$	$t$
	$F_{(5, 54)}=5.14^{**}, R_{adj}^2 = 0.26$		$F_{(5, 54)}=6.02^{***}, R_{adj}^2 = 0.30$		$F_{(5, 54)}=9.22^{***}, R_{adj}^2 = 0.41$		$F_{(5, 54)}=3.59^{**}, R_{adj}^2 = 0.18$	
Trait EI	-0.28	-2.43*	-0.25	-2.19*	-0.21	1.99†	-0.18	1.47
Pleasantness	-0.13	-1.02	-0.33	-2.59*	-0.42	3.67**	-0.20	1.47
Arousal	0.08	0.68	0.03	0.27	-0.09	-0.81	0.24	1.79
HADS-A	0.46	3.61**	0.41	3.38**	0.46	4.11**	0.26	1.99†
HADS-D	-0.31	-2.42*	-0.29	-2.36*	-0.12	-1.03	-0.11	-0.83

† $p=0.051$ , \* $p<0.05$ , \*\* $p<0.01$ , \*\*\* $p<0.001$

individual differences. Until recently, such collaborations had focused on the ‘big-five’ personality traits (namely, openness to experience, conscientiousness, extraversion, agreeableness and neuroticism) [10, 11], which do not provide comprehensive coverage of the emotional aspects of personality [13]. This study corroborates the very significant role that emotions play when individuals have to grapple with the possibility of a life-altering diagnosis. Given that psychological interventions are severely underutilised in cancer treatment programmes [34] and psychological impairment is often left untreated [2], it seems likely that substantial strides may be taken by the development and implementation of interventions focusing specifically on patients’ emotional self-perceptions [35–37].

The findings of this study ought to be evaluated with reference to the study’s limitations. First of all, the sample size was rather small, partly due to the specificity of the population under investigation. Although these findings ought to be replicated with a larger sample, the correlations that were obtained suggest substantial associations between trait EI and patients’ experienced worry across the urological cancer diagnostic pathway. Secondly, the stronger associations between trait EI and worry that were obtained at the pre-appointment stage may have been inflated by the fact

that the TEIQue-SF measure was completed immediately prior to these worry measures. The degree of inflation, however, would appear to be rather low, since most significant associations between trait EI and worry retained their strength in the post-appointment data. Thirdly, despite the good reliability of the HADS in the literature [38], we observed only moderate alphas in this patient group (0.63 and 0.65 for HADS-A and HADS-D, respectively). More importantly, the worry criteria were all measured via single-item questions, which although practical within the clinical setting of the study, generally tend to have low reliability [39]. Because reliability places an upper limit on correlations, it is important to note that the trait EI effects that are reported here constitute lower-bound estimates of the corresponding population associations.

Finally, the majority of worry ratings (with the exception of those concerning ‘awaiting the specialist’) were patients’ retrospective accounts of their previously experienced emotional states. Despite retrospective assessments of emotions being generally valid, such reports can be subject to biases [40]. For example, retrospective reports can be affected by episodic memory (i.e. memory of specific events and the emotions elicited during them), situation-specific beliefs (i.e. beliefs about emotions that are likely to be elicited in that situation)

**Table 4** Regression of post-appointment worry variables onto trait EI, pleasantness, arousal, HADS-A and HADS-D ( $N=59$ )

	Deciding to see GP		Awaiting GP		Seeing GP		Awaiting specialist		Seeing specialist	
	$\beta$	$t$	$\beta$	$t$	$\beta$	$t$	$\beta$	$t$	$\beta$	$t$
	$F_{(5, 40)}=6.01^{***}, R_{adj}^2 = 0.36$		$F_{(5, 40)}=5.57^{**}, R_{adj}^2 = 0.34$		$F_{(5, 40)}=5.06^{**}, R_{adj}^2 = 0.31$		$F_{(5, 40)}=6.91^{***}, R_{adj}^2 = 0.40$		$F_{(5, 39)}=4.55^{**}, R_{adj}^2 = 0.29$	
Trait EI	-0.32	-2.68*	-0.30	-2.41*	-0.20	-1.57	-0.21	-1.81	-0.12	-0.95
Pleasantness	-0.34	-2.59*	-0.33	-2.49*	-0.39	-2.86**	-0.49	-3.87***	-0.49	-3.49**
Arousal	0.05	0.35	0.09	0.66	0.09	0.67	0.11	0.85	0.05	0.38
HADS-A	0.47	3.60**	0.45	3.37**	0.41	2.97**	0.36	2.79**	0.32	2.27*
HADS-D	-0.18	-1.35	-0.16	-1.20	-0.10	-0.73	-0.12	-0.94	-0.17	-1.18

\* $p<0.05$ , \*\* $p<0.01$ , \*\*\* $p<0.001$



and identity-related beliefs (i.e. general beliefs about one's own emotions). The finding that trait EI was more strongly associated with pre-appointment worry may, therefore, also be a result of the 'cognitive constructs' patients used when reporting worry retrospectively. Prospective evaluation of worry experienced at each one of the cancer pathway stages examined in this study (and indeed at stages that occur following a diagnosis, e.g. treatment and surveillance) would offer an ideal approach to extending these findings.

Our findings have implications for the management of the emotional impact created by entering the diagnostic cancer pathway and can provide the basis for more effective psychological support to those that warrant it during the different stages of this pathway. While most EI interventions to date are intensive and time-consuming [35–37], more succinct versions could eventually be adapted for use with high-risk individuals in healthcare settings—a task that nurses typically see as integral to their role [41, 42]. For example, emotional regulation techniques could be provided in the form of written information to patients who report or appear to the healthcare professional to be particularly worried. In addition, information that is supplied to patients prior to their appointment could emphasise the potential role of significant social others in providing emotional as well as practical support. Such brief interventions may bolster the abilities of individuals with low trait EI to cope with the higher levels of worry that this paper shows they experience. The efficacy as well as the feasibility of such interventions using existing NHS resources should subsequently be evaluated in future research.

It should also be noted that trait EI interventions can target not only the traits themselves (i.e. the personality characteristics), which tend to be resistant to change in adulthood [43], but also the consequences of the traits, which are much more susceptible to our control. For example, having been made aware of a very high score on the trait EI facet of self-esteem, we can start developing strategies for preventing this facet from manifesting in a dysfunctional manner in our lives (e.g. as narcissism [25]).

This research contributes to the growing field of trait EI and psychological well-being by demonstrating an association between trait EI and worry throughout the early stages of the diagnostic cancer pathway. Researchers should continue to develop innovative ways to identify and help individuals at increased risk of experiencing poor psychological outcomes as a result of suddenly becoming involved in various healthcare settings. The study has implications for the development of brief interventions informed by trait EI theory, which can be targeted towards patients who are at a high risk of experiencing psychological impairment.

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