Trends in Undergraduate Research (2025) 8(1): f11-25
https://doi.org/10.33736/tur.9087.2025

Linguistic Markers of Emotions and Coping Stages in Narratives of Cancer Survivors

Su-Hie Ting[a,*] and Faynella Freddy[b]
[a]*Faculty of Education, Language and Communication, Kota Samarahan, Malaysia*
[b]*St Dominic Primary School, 91120 Lahad Datu, Sabah, Malaysia.*

Date received: 17/02/2025 Date accepted: 14/05/2025
*Corresponding author's email: shting@unimas.my

Abstract

Linguistic markers in emotional disclosures have not been investigated to identify the stage of emotional adjustment to cancer. The study examined linguistic markers of emotions and coping stages in written narratives of cancer survivors. Using the Linguistic Inquiry and Word Count (LIWC) framework, 20 narratives with 18,287 words written by cancer survivors collected from five cancer organisation websites, blogs and online magazines were analysed. The 50 most frequently used words in the cancer narratives appeared 1,153 times because some words were repeatedly used. There were more negative emotional processes (39.20%) than positive emotional processes (18.73%) or cognitive processes (21.16%). Most of the narratives contained words associated to denial, depression, and acceptance. Depression and acceptance were recurring in the cancer narratives. The depression stage was associated with negative emotions but the acceptance stage was associated with cognitive processes. The findings suggest that the decline in emotional words co-occurs with an increase in cognitive words from depression to acceptance, suggesting that cognitive mechanisms are utilised to cope with cancer.

Keywords: ***L****inguistic marker, Emotional processes, Cognitive processes, Coping stages, Cancer narratives*

---

1. INTRODUCTION

In medical humanities, patient stories and subjective experiences are studied to understand the sensemaking of patients suffering from illnesses. Among the diseases, cancer has severe negative psychological impact on patients because of the intangible and internal nature of the danger, the unpredictability surrounding treatment outcomes, and the uncertain course the illness may take, all of which contribute to serious disruptions in psychological health (Martino et al., 2022). Nonetheless, with adequate support, such as active participation in online support groups, cancer patients can have positive psychosocial outcomes (Han et al., 2008). Cancer experiences involve mostly emotional coping processes rather than cognitive processes (Graves et al., 2005; Martino et al., 2015; Owen et al., 2006; Smith et al., 2005). The narratives or disclosures serve as a kind of social support which help caregivers and patients to make sense of the traumatic experiences (Freda & Martino, 2015; Schwartz & Drotar, 2004;). Within this context, cancer narratives have emerged as a vital area of research, offering valuable insights into how patients linguistically construct meaning, cope with illness, and negotiate identity through storytelling.

Coping include "the specific and psychological efforts used to deal with stressful events or the negative effects of the agents of these (Inci et al., 2021, p. 956). They attempt to have a more positive outlook on their cancer experience. For instance, older breast cancer patients cope using positive reappraisal, revaluing ordinary events, and problem-focused coping but they cannot escape from social comparison and denial (Nilsen et al., 2021). Inci et al.'s (2021) study showed that cancer patients usually struggle to engage in active problem-solving and plan for the future due to severity of the disease and the limited life expectancy; instead they cope with humour about trivial matters, occasional denial to escape the reality of the disease, and increased substance use. The studies focused on theme-based coping strategies, but did not situate them in a time-line from discovery of cancer to the stage of coming to terms with the cancer.

The emotional trajectory of cancer experiences changes from negative to positive as the patients move through different stages of coping with cancer. The collaborative efforts of researchers in linguistics and health communication have shown that words used by cancer patients and survivors may reflect their emotional and mental state. For example, Schwartz and Drotar (2004) found that a decrease in negative emotion words is accompanied by an increase in negative cognition-words in the written narratives of caregivers of youth with chronic illness over four months of the treatment. "Many cancer patients successfully traverse the stressful path of their illness, managing to maintain a semblance of normality in their daily routines and in some instances, experiencing personal growth" (Unal & Ordu, 2023, p. 8882). In the context of Kübler-Ross's (1969) stage model of grief, the cancer patients may have survived the denial, anger, bargaining and depression stages and are in the acceptance stage whereby they come to terms with the cancer.

However, the study of coping stages and emotional and cognitive aspects of cancer narratives are largely two separate lines of investigation. Earlier studies that focus on emotional and cognitive processes in cancer narratives did not relate the words used to the coping stages (Graves et al., 2005; Martino et al., 2015; Owen et al., 2006; Smith et al., 2005). Our comprehensive literature search identified only one study on the linguistic features of emotional disclosures in connection with illness trajectory. Chen and Zhao's (2021) analysis of narratives from breast cancer patients across Stages I to IV shows an increase in the use of positive emotional words, a decrease in anxiety-related terms, and a steady frequent use of cognitive processing words. However, there are rises and falls in the use of anger- and sadness-related words. There is a gap of knowledge which needs to be filled to understand whether the words used when talking about cancer experiences can reveal the stage of coping with the illness. The linguistic cues will enable healthcare workers and caregivers to offer the right kind of support and understanding.

This research examined the linguistic markers of emotional and cognitive processes in experiences of coping with cancer in written narratives of cancer survivors. The specific objectives of the study were to:

1. identify the linguistic markers of emotional and cognitive processes in the cancer narratives;
2. determine the different stages of coping with cancer in the cancer narratives in the context of Kübler-Ross's (1969) stage model of grief; and
3. link the emotional and cognitive processes to stages of coping with cancer.

2. THEORETICAL FRAMEWORK OF STUDY

In this study, the theoretical framework for coping with cancer experience is Kübler-Ross's (1969) stage model of grief. This model was originally formulated to explain the grieving process following the death of a loved one. Kübler-Ross (1969) conceptualised grieving in five linear stages of emotional adjustment are denial, anger, bargaining, depression and acceptance. In later years, Kübler-Ross's (1969) model was employed to understand experiences of cancer from the perspective of either the patient (Croson & Keim-Malpass, 2016; Wilson, 2016) or caregiver (Masa'deh et al., 2017; Günay, & Özkan. 2019). The cancer patients may not experience a physical death upon receiving diagnosis of the cancer but grieve the loss of their identity and health.

There are criticisms of Kübler-Ross's (1969) stage model of grief. Some researchers like Telford et al. (2006) and Chou et al. (2011) argue that the uniqueness of patient experiences mean that their experiences cannot be mapped onto a grieving process model. However, after analysing the blog postings of young women with fertility and parenting problems due to cancer, Croson and Keim-Malpass (2016, p. 753) conclude that "although the experience of grief is complex and the discussion of denial, depression, and acceptance offers a simplistic view of the grief trajectory, this analysis showed that the stages of grief have merit". We acknowledge that while Kübler-Ross's (1969) model cannot account for every facet of the cancer experience, it provides insights into where patients are in their illness trajectory following cancer diagnosis. A recent study by Chen and Zhao (2021) analysed the words used by cancer patients and mapped them to the stages in Kübler-Ross' (1969) Model, and obtained insightful findings (as described in the Introduction section).

Table 1 shows stages of coping based on Kübler-Ross' Model (1969), with examples of words from other studies (Croson & Keim-Malpass, 2016; Masa'deh et al., 2017). The wide range of words fleshes out what denial, anger, bargaining, depression, and acceptance may mean to various cancer patients, and facilitates the identification of stages of coping in the cancer narratives for deductive analysis.

Table 1. Stages of coping based on Kübler-Ross' Model (1969)

Stage	Experiences
1. Denial	Avoidance, shock, confusion, elation, fear, despair[3], a bad dream they cannot escape from[3], stunned or dazed[2], refusal to accept information[2], insistence that there is a mistake with test results[2], lack of comprehension on what is said about the disease[2], maintaining normalcy[1]
2. Anger	Frustration, irritation, anxiety, self-blame*, self-devaluing*, hostility to those around[2], guilt[2]
3. Bargaining	"What if" and "if only" thoughts and statements, actions to avoid getting cancer[3], actions to heal from cancer (if no benefit, at least it does not harm) [3]
4. Depression	Helplessness, hopelessness, numbness feeling, other negative impacts like stress and deprivation[3], sad and withdrawn[2], lack of control[1], identity loss[1]
5. Acceptance	Moving on, coming to terms with the new "reality" as part of life, accepting new identities and situations[1]

Note: The superscripts indicate sources of additional descriptors: [1]Croson and Keim-Malpass (2016), [2]Falek and Britton (1974), [3]Masa'deh et al. (2017)

3. METHOD OF STUDY

This descriptive study involved content analysis of the narratives of cancer survivors for coping stages and the linguistic analysis of the markers of emotional and cognitive processes.

The data for the study were 20 cancer narratives of 18,287 words written by cancer survivors collected from five cancer organisation websites and blogs and online magazines "cancer narratives" and "cancer stories" as the search terms. The five websites are as follows:

1. It's Your Life – https://itsyourlife.net.my
2. Malaysian CARE – https://www.malaysiancare.org
3. SHARE Cancer Support – https://www.sharecancersupport.org
4. Teenage Cancer Trust – https://www.teenagecancertrust.org
5. Cancer Council – https://www.cancer.org.au

The narratives selected for the study were written by the cancer patients or survivors but personal and background information about the writers cannot be given for anonymity. Furthermore, sometimes pseudonyms are used, thereby concealing the actual identity of the writer. Magazine articles written by journalists about the experiences were excluded. Type of cancer, stages of diagnosis and stages of recovery were not exclusion criteria. The first four articles from each of the five blogs were collected. These five websites were chosen because they provide sharing of cancer survivors that are accessible to the public to view. The first three websites are Malaysian, while Teenage Cancer Trust is based in the United Kingdom, and Cancer Council is based in Australia.

To analyse the linguistic markers of emotional and cognitive processes, Pennebaker et al.'s (2015) Linguistic Inquiry and Word Count (LIWC) framework was employed. Kahn et al. (2007) states that LIWC is useful for analysing emotional expression in written disclosures. LIWC is appropriate for the present study as it systematically quantifies emotional language in written text. Its validated categories, including positive and negative emotion words, reveal the psychological states of the cancer patients and survivors. Past studies have successfully used this data-driven approach for categorising language in cancer narratives (e.g. Graves et al., 2005; Han et al., 2008; Owen et al., 2006; Martino et al., 2015; Smith et al., 2005). The LIWC tool calculates the frequency of words and converts them into percentages for 80 language categories, such as pronouns and psychological and personal concern categories. Although there are many language categories, we focused on emotional and cognitive words because these are relevant to understand psychological processes experienced by cancer patients and survivors. Emotional markers provide insights into individuals' affective states, while cognitive markers highlight mental processes like thought patterns, self-reflection, and reasoning. Examples of linguistic markers of emotional and cognitive processes are as follows:

- Positive emotions: Good, love, happy
- Negative emotions: Worthlessness, ineffectiveness, hatred, enemy
- Cognitive processes: recognise, know, in fact, why, then, think, consider

The narratives were compiled and converted into text files which were uploaded into AntConc software to identify the 50 most frequently used words. The choice to analyse the top 50 most frequently used words in the narratives is based on both methodological and practical reasons. Methodologically, there is precedent in previous research on the use of top 50 words as a cut-off point (Stamatatos et al., 2000; Rutherford, 2005). In fact, Martinez et al. (2009) analysed only the top 20 words. Practically, analysing too many frequently used words may end up including words that are less meaningful.

Two types of analysis were performed by the researchers. Firstly, the words associated with emotional (positive and negative) and cognitive processes were marked in the whole cancer narrative. The categorisation of words by LIWC into emotional and cognitive words was checked by reading the context in which the words were used. Secondly, to analyse stages of coping with cancer, the cancer narratives were read and reread. The stages of coping were marked on the texts. Reference was made to Table 1 which shows many nouns, adjectives and verbs related to denial, anger, bargaining, depression, and acceptance. After the coding of stages had stabilised, the sequence of stages was mapped out for each narrative. Finally, the number of emotional (positive and negative) and cognitive words were counted for the various stages to show the frequency of occurrence.

4. RESULTS

In the results section, the 20 written narratives of cancer survivors are referred to as CS1 to CS20. The analysis focussed on the 50 most frequently used words identified by the AntConc software.

4.1. Linguistic Markers of Emotional and Cognitive Processes

The top 50 most frequently used words in the cancer narratives appear 1,153 times because some words were repeatedly used (Table 2). More words signify emotional processes (n=40) than cognitive processes (n=10) indicating that an overwhelmingly emotional experience rather than a rational reaction. There is more variety of linguistic markers for negative emotional processes (n=21) than positive emotional processes (n=12). The cancer experience is traumatic, indicated by higher frequency of negative words (452 times or 39.20%) than positive words (216 times or 18.73% of 1,153) and cognitive words (244 times or 21.16%). The cancer survivors used seven words to signify both positive and negative experiences, totalling 241 times (20.90%).

Table 2. Linguistic markers of positive emotions, negative emotions and cognitive processes in written narratives of cancer survivors

Emotional processes (n=40)						Cognitive processes (n=10)	
Positive emotions (n=12)		Negative emotions (n=21)		Positive and Negative Emotions (n=7)			
Rank of words	Frequency of occurrence	Rank of words	Frequency of occurrence	Rank of words	Frequency of occurrence	Rank of words	Frequency of occurrence
7-family	34	4-breast	50	1-life	92	3-Could	54
19-friends	20	5-treatment	39	2-time	60	6-Felt	38
20-hope	20	9-doctor	28	13-work	25	8-because	32
22-good	19	10-chemo	27	29-new	17	16-thought	21
25-home	18	11-hospital	27	33-long	16	23-knew	19
31-well	17	12-surgery	25	34-over	16	26-which	18
36-support	16	14-results	22	42-story	15	28-feel	17
37-children	15	15-radiation	21			30-think	17
39-live	15	17-diagnosed	20			43-where	15
40-love	15	18-fear	20			49-believe	13
47-trust	14	21-stage	20				
50-God	13	24-disease	18				
		27-diagnosis	17				
		32-down	16				
		35-pain	16				
		38-doctors	15				
		41-oncologist	15				
		44-cervical	14				
		45-health	14				
		46-lump	14				
		48-tumour	14				
Total	216 (18.73%)		452 (39.20%)		241 (20.90%)		244 (21.16%)

Note: The number in front of the words shows the ranking of the word in the corpus. For example, 7-family shows that the word “family” is the top seventh word used in the written narratives. The ranking is based on the “frequency of occurrence” (next column), which is the number of times a particular word is used in the corpus. For example, “family” is used 34 times in the written narratives.

4.1.1. Linguistic Markers of Emotional Processes

Table 2 shows the linguistic markers of positive emotions include people close to the cancer survivors (family, friends, children, God, home [signifying family]), and optimism (hope, good, well, support, love, trust, live). People who are close to them give them support and hope to survive the cancer. The highest ranked positive word is “family”, occurring 34 times in the written narratives, showing that the patients’ family is their main support system helping them to cope with cancer.

The linguistic markers of negative emotions revolve around the disease, treatment, medical personnel, and negative feelings. The highest ranked negative word is “breast”, occurring 50 times in the written narratives. This is because 11 out of the 20 cancer narratives were written by breast cancer survivors. The second highest ranked negative word is “treatment” (39 times). The cancer survivors highlighted the treatment they received (treatment, chemo, surgery, radiation) following the diagnosis of cancer (stage, diagnosis/diagnosed, results) by their medical personnel (doctor, hospital, oncologist). For example, “hospital” and “doctor” symbolise negative experiences for the cancer survivors as they are reminders of the cancer diagnosis and the prolonged medical check-ups and treatments.

In addition, the cancer survivors in the present study often highlighted the test results confirming the cancer. “Results” is a negative word that appears 22 times in the narratives. The cancer survivors did not really mention the signs of cancer (lump, tumour) and avoided the word “cancer” which is why it is not among the top 50 words. In comparison to treatment, cancer survivors talked little about their feelings of fear, feeling down and physical discomfort such as pain and ill-health. This result is not surprising considering Salander et al.’s (2002) findings. In their study, when cancer patients received bad news (diagnosis), none of them demanded more information about the prognosis, as cancer is often connected to death and, in fact, their narratives showed that they mentally distance themselves from the prognosis in order to have hope in the treatment. The treatment theme is also dominant in other narrative studies (e.g., Gotay, 1984:Chou et al., 2011). Men are more concerned with treatment information, medical personnel and procedures while women are more concerned with the emotional support, evident from Searle et al.’s (2006) analysis of interviews and web forums. In both the present study and Chou et al. (2011), impersonal references (e.g., they, the doctor) are used to talk about the medical personnel. According to Chou et al. (2011), the use of impersonal references indicates the peripheral involvement of others and their own central role in the cancer journeys. The dominance of the treatment theme in cancer narratives does not seem to have changed since Gotay’s (1984) early study. The early and advanced stage cancer patients interviewed expressed their fear of the cancer diagnosis, prognosis and recurrence regardless of the stage of cancer. However, the advanced stage cancer patients were particularly worried about the side effects of treatment, restriction on activities and changes in their lifestyle.

The analysis of cancer narratives revealed that seven words are used with both positive and negative meanings, namely, “life”, “time”, “work”, “new”, “long”, “over” and “story”. “Life” is the most frequently used word, occurring 92 times in the narratives (Table 2). The use of the word “life” changes from negative at the early stage when news on cancer broke out to positive at a later stage when they accepted the reality that they have cancer, as illustrated in Excerpt 1.

Excerpt 1

> I felt terror. I felt the camera lens of my **life** – the aperture – closing for good. I thought: This is it. I’m going to die. My husband and I curled up together in the early mornings and wept quietly so our teen daughter would not hear. Despair sucked each step, each breath into worthlessness. Grief smothered our house.
>
> And the last few months of my **life** have been spent recovering from it. One rib was removed, a part of my back muscle was taken out, and the loss of mobility is palpable. Daily I pull the red, yellow, and blue bands of physical therapy, press the walls, and stretch and knead my tendons in order to get the strength back. Slowly, my right arm and shoulder are warming to movement. And if some stiffness, some pain is the price I pay for **life**, it is a cost I gladly pay. (CS8)

“Time” ranks second and appears 60 times in the cancer narratives to show the major events in the illness trajectory. “Work” is ranked 12, appearing 25 times. Much to their dismay, work had to be put on hold because of ill-health and treatment. They also wrote about how they coped with their cancer. The other words with both positive and negative meanings occur less than 20 times each, referring to the "new" lease of life after the "long" ordeal with cancer is "over".

The analysis produced a new finding in that words can signify both positive and negative emotional processes, an observation which cannot be made by relying on LIWC analysis alone. LIWC cannot identify irony, sarcasm, and unusual sentence structure and therefore may incorrectly classify words, and a sentence such as "I was not at all happy" would add to the positive feelings count (as cited in Kahn et al., 2007, p. 281). However, this limitation is overcome by performing a qualitative analysis to check the context in which the emotional and cognitive words are used.

4.1.2. Linguistic Markers of Cognitive Processes

The categorisation of linguistic markers for cognitive processes, based on Tausczik and Pennebaker (2010), is into insight words (e.g., consider, think, know), causal words (e.g., because, hence), and tentative words (e.g., perhaps, maybe, guess). Out of 10 linguistic markers of cognitive processes, the results show six insight words (feel/felt, think/thought, knew, believe), three causal words (because, which, where), and one tentative word (could).

Among the words signifying cognitive processes, the tentative word "could" topped the list (ranked 3). "Could" is a modal verb that signifies cancer survivors' uncertainty upon receiving news of the cancer. For example, CS9 asked "What could possibly be wrong?". "Could" is usually used in the negative, carrying the meaning of inability of the cancer survivors and their caregivers to perform their usual activities, as shown in Excerpt 2. "Could" is used only once in the cancer narratives by CS15 to show ability to do things (see Excerpt 2). It can be said that high frequency of tentative words in the cancer narratives indicate the cancer survivors' uncertainty about their health and the inabilities.

Excerpt 2

> Tuesday was a blur of telling friends and family the news. Wednesday arrived and I **couldn't** wait to meet the oncologist. I was so nervous that I just paced. I couldn't sit down. My oncologist examined me and talked to me. She exuded confidence, calm, compassion, kindness and professionalism. For the first time in two days, I had hope. … [On Thursday] That night our lawyer stopped by so that I **could** sign a living will and health care proxy. Now that was a real thrill! I had gone through this with my father a few years earlier and it seemed like I was too young to need to do this. I was only 45. (CS15)

The analysis of insight words in the cancer narratives showed "an active process of reappraisal" (Tausczik & Pennebaker, 2010, p. 35) of cancer experiences. The more frequent use of the past tense form of insight words ("felt" and "think") clearly placed the cancer experience as a past event, and it is also because the cancer experiences are described the retrospective. "Felt" is sixth in frequency but "feel" is number 28. "Feel/felt" collocates with expression of physical sensations and emotions, like when, CS9 first "felt a slight burning sensation" (Excerpt 3). Later in the cancer narrative, CS9 described her desolation using the past tense "felt".

Excerpt 3

> I am a 6 year breast cancer survivor. My story began November 2011 when I **felt** a slight burning sensation in my right breast. I was working as a daycare provider and neglected to do anything, hoping the burning sensation was temporary. …
>
> Two doctors spoke with me. "I am sorry, you have breast cancer," they said. Here came the tears; the doctors left the room and gave me time to cry alone, as I **felt** as nothing else was ever going to be the same. (CS9)

Similarly, "thought" (ranked 16) appears more frequently in the cancer narratives than "think" (ranked 30). When cancer survivors can bring themselves to process painful past experiences instead of refusing to think about it, they will experience better health outcomes (Tausczik & Pennebaker

(2010). Similarly, when caregivers can verbalise their thoughts and emotions, the emotional disclosure helps them to make sense of the traumatic experience, resulting in a better physical health-related quality of life (Schwartz & Drotar, 2004).

In the present study, the cancer survivors used causal words to provide causal explanations in their narratives. “Because” (ranked 8) appears in the cancer narratives more than relative pronouns “which” (ranked 26) and “where” (ranked 15). “Because” is used to pre-empt other explanations or justifications in the cancer narratives whereas the relative pronouns (which, where) add more details. Excerpt 4 shows the use of “because” to explain the situation which led to the discovery of the cervical cancer for CS1. Causal words are used to create causal explanations to organise their thoughts (Tausczik & Pennebaker, 2010). The relative pronoun “where” elaborated the thoughts that came to her mind the moment when she watched her sleeping son. Similarly, the relative pronoun “which” adds information that human papillomavirus is the cause of cervical cancer.

Excerpt 4

> When I was just 34, I was told I had cervical cancer. I remember the day I was diagnosed clearly. I was at a routine visit to my gynaecologist **because** my husband and I were hoping to have a second child. …
>
> I was at the weakest point of my life and needed support from real people who understood my struggle. I remember one night I looked at my son while he was asleep and had a moment **where** I thought to myself: You have to fight to live because there are so many people out there who love you. …
>
> Today, I always encourage my family, friends and colleagues to go for regular Pap smear screenings and to vaccinated against the human papillomavirus (also known as HPV), **which** is the main cause of cervical cancer. (CS1)

The analysis revealed that causal words have a more important function which is to help the readers understand the cancer narrative, whether it is to help them understand why they behave or think in certain ways or to help them understand why certain things are done in the cancer treatment.

4.2. Coping with Cancer in Cancer Patient Narratives

The dominant experiences etched in the cancer survivors’ memory are denial, depression, and acceptance, which appeared in most of the cancer narratives analysed. Table 3 shows that depression and acceptance occurred in all the written narratives, sometimes more than once (total of 22 and 29 respectively) and denial was present in 17 narratives. In comparison, words related to anger (n=6) and bargaining (n=1) were less frequent.

Table 3. Sequence of stages of coping with cancer in cancer survivors’ narratives

Text	Number of Stages	Sequence of Stages of Coping with Cancer
Text 1	4	Denial → Anger → Depression → Acceptance
Text 2	5	Denial → Anger → Acceptance → Depression → Acceptance
Text 3	5	Denial → Anger →Acceptance → Depression → Acceptance
Text 4	3	Anger → Depression → Acceptance
Text 5	3	Denial → Depression → Acceptance
Text 6	4	Depression → Acceptance → Depression → Acceptance
Text 7	2	Denial → Acceptance
Text 8	5	Denial → Depression → Acceptance → Depression → Acceptance
Text 9	3	Denial → Depression → Acceptance
Text 10	2	Denial → Acceptance
Text 11	5	Anger → Depression → Acceptance → Depression → Acceptance

Text 12	3	Denial → Depression → Acceptance
Text 13	3	Denial → Depression → Acceptance
Text 14	5	Denial → Bargaining → Acceptance → Depression → Acceptance
Text 15	3	Denial → Depression → Acceptance
Text 16	4	Denial → Acceptance → Depression → Acceptance
Text 17	4	Denial → Acceptance → Depression → Anger → Acceptance
Text 18	3	Denial → Depression → Acceptance
Text 19	6	Denial → Anger → Depression → Acceptance → Depression → Acceptance
Text 20	3	Denial → Depression → Acceptance

The most "sketchy" narrative consisted of only two stages which are denial and acceptance (CS7 and CS10). CS7 was initially in denial as she ignored the mole. Excerpt 5 shows an example of denial in the cancer narratives.

Excerpt 5

> At 29, I went to see my GP for a minor illness. When I lifted my shirt for him to use a stethoscope on my chest he noticed some moles, and started looking at an unusual mole on my shoulder. "I'm going to refer you to a dermatologist. You need to get that checked out sooner rather than later," he urged me. I wasn't too worried about it. As the mole was in a spot I couldn't really see without a mirror, it was a bit "out of sight, out of mind", so I ignored it. But when someone pointed out that the mole was weeping through my shirt a few months later, I knew it was time to get it sorted. (CS7)

When CS7 could not ignore the mole any longer, she went to see a dermatologist for a biopsy, and her family history of having melanoma helped her to believe the dermatologist's assessment, cutting short the denial stage. Denial is a coping mechanism that occurs after a person realises a loss, allowing him or her to handle the immediate period of grief (Croson & Keim-Malpass, 2016). "Kubler-Ross viewed denial as healthy when it served a protective function in the short term. If prolonged, however, it would result in complicated or pathological grief" (cited in Telford et al., 2006, p. 456). In the context of narrative structure, the denial stage serves as an orientation of the cancer story and the acceptance stage serves as the resolution. CS7 ended her narrative by talking about how she wanted to encourage others to see a dermatologist if they have any suspicious or changing moles and cautioned them against spending too much time outdoors to avoid skin cancer. In this study, only two of 20 narratives had denial-acceptance as the content, and 18 other cancer survivors had described a longer journey in adjusting to cancer.

Out of 20 narratives, 18 contained episodes of depression. For CS17, it was a case of recurrence. She was having chemotherapy every three weeks for eight months, followed by six weeks of radiation, five days a week. She had a mastectomy and reconstructive surgery on the same day, and thought she was done with cancer and could move on with my life. But the optimistic phase was short-lived. CS17's depression was evident when she said "I started to feel defeated" and "Unfortunately, I was hit with one hard blow after another." Excerpt 6 shows an example of depression in the cancer narratives.

Excerpt 6

> I was diagnosed again and this time, the cancer was deemed terminal: stage IV metastatic, HER2+, ER+, PR+. It was now in my bones, lungs and liver. **I started to feel defeated** but knew I had to keep it together for my family, especially my two daughters. And this time, chemotherapy left me sicker, sometimes leaving me so weak that I had to crawl from my bed to the bathroom a few feet away.**Unfortunately, I was hit with one hard blow after another**. Just a couple months later, in January 2002, while attending a movie at a nearby theater, I received frantic phone calls from my new oncologist, instructing me to call her immediately. After contacting her, she told me to come directly to the hospital; recent scans had revealed that I had a blood clot in my lungs. (CS17)

Cancer survivors come to the stage of acceptance when they can talk about how cancer had changed their lives, and they can be grateful that they are still alive, despite their trauamatic experiences. Excerpt 7 shows an example of acceptance in the cancer narratives.

Excerpt 7

> After the last radiation session, I quickly got into my car and headed toward work. After only a few minutes, I had to pull over. Tears blinded my eyes. As I sat in my car, I became **overwhelmed with emotion and gratitude as the pain poured out of me. I'd run a rigorous course and finally sprinted past the finish line**. (CS12)

Depression is the most elaborated of the grieving stages in the blogs of women who had cancer (Croson & Keim-Malpass, 2016) and in the interviews of parents whose children had cancer (Masa'deh et al., 2017; see also Cernvall et al., 2015). The analysis of cancer narratives shows that the stages of coping in Kübler-Ross's (1969) model is not linear because nine cancer narratives contain relapses into depression. Sometimes the treatment did not work as anticipated, like for CS19 (Excerpt 8).

Excerpt 8

> I entered the maintenance stage of my treatment in April 2014 which, from where I'd come, was a massive milestone. Life was going to get better and I was going to get my freedom back. I expected to go back to school and lead off from where things were left. But it was all too different, I found when I came back to school a lot of my friends had changed and moved on. I lost a lot of confidence and found it extremely difficult to hold a conversation with someone, without talking about cancer. (CS19)

Cancer had ruled CS19's life, so much so that she could not prevent herself from talking about cancer. She joined new activities but it was knowing that "everyone else" at the Teenage Cancer Trust felt the same way which enabled her to begin to get her life back together. It it is normal for cancer survivors to want to be like everyone else, and they find it hard to accept the physical and psychological changes. As such, relapsing into depression after acceptance is common in cancer experiences (Kübler-Ross & Kessler, 2005; Burns, 2017).

Bargaining only appeared in the cancer narrative of CS14. When CS14 wrote "I always felt as if there was something else that I could do or a different way to do things", it shows that she was having inner monologues on how she could have done or done differently (Excerpt 9).

Excerpt 9

> I imagined life as a long, long "to do" list while my job was to erase as many items on the list as I could. I never stopped for a moment to ask myself questions such as – do I really want to do this thing? or if not – why am I doing it anyway? What do I feel while doing these things? Why can't I ask for help in doing these things? Do I feel I have control of my life or does the "to do" list control me? Needless to say that even though I had everything a person might wish for in life, I wasn't feeling too happy or too satisfied. **I always felt as if there was something else that I could do or a different way to do things**. (CS9)

The bargaining is not as clear as examples given in Table 1 where patients may bargain with God to let them survive the cancer and they would pay back in certain ways. From the analysis of blogs for women who have lose fertility due to cancer, Croson and Keim-Malpass (2016) concluded that anger and bargaining are less frequently found than denial, depression, and acceptance. An example of anger is shown in Excerpt 10. CS3 put her anger mildly as "I was upset".

Excerpt 10

> My doctor ran a biopsy and told me to remain calm as I waited for the results. It turned out that I had a rare type of cervical cancer, which cannot be detected by Pap smear screenings. **I was upset** that this had happened to me after I finally turned my life around. (CS3)

It is likely that these bargaining and anger are more transient, and less likely to be written about them compared to denial and depression. Falek and Britton (1974) stated that denial is a brief period in the grief process due to the onslaught of cognitive information which pushes them out of their denial state. In contrast, depression is often one of the longer-lasting stages, and normal (Croson & Keim-Malpass, 2016).

Emotional and cognitive processes in experiences of coping with cancer

Figure 1 shows that there is a general decline in the three categories of linguistic markers from denial to anger and bargaining. For this analysis, the seven words signifying both positive and negative emotional processes were omitted for ease of comparison.

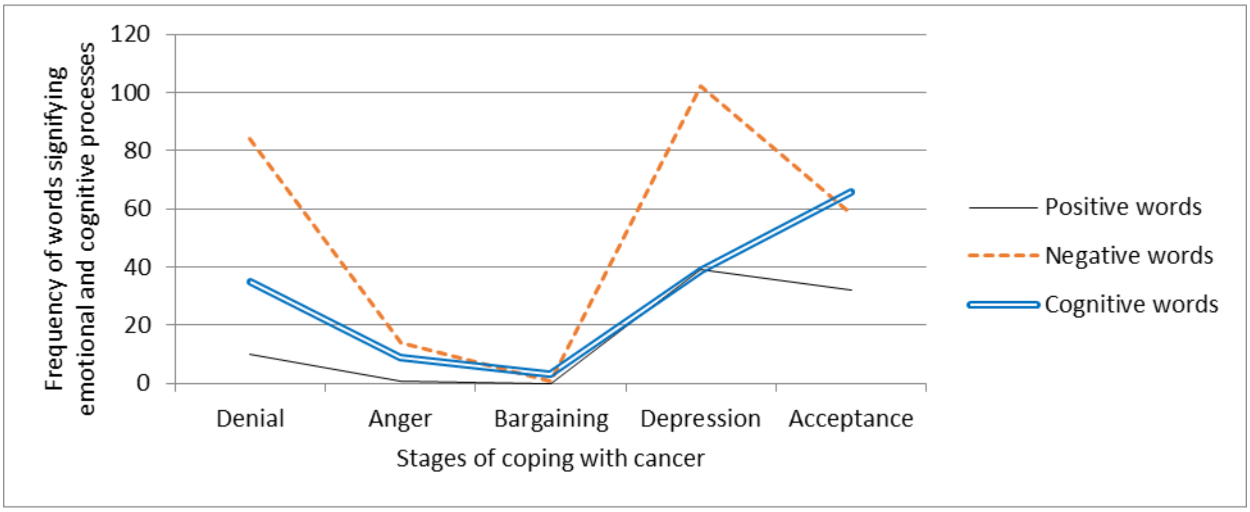

Figure 1. Frequencies in which the top 50 words signifying emotional and cognitive processes were used in five stages of coping with cancer

The results showed that the cancer survivors continued to use more cognitive words in their narratives as they progressed from bargaining to depression to acceptance. The frequencies of positive and negative words peaked at depression and dropped in the acceptance stage. Taken together, the results suggest that while depression is an emotional stage, acceptance is a cognitive process. Excerpt 11 from CS15's cancer narrative illustrates the logical reasoning that characterised the acceptance stage in the cancer narratives.

Excerpt 11

> Cancer has changed my life. I must say that my life is better now after cancer. I have my priorities straight and I feel love and emotions on a deeper level. Complaining about the weather seems silly to me now. I am just glad to be here to see the weather! I never would have guessed that I would resign from my job (that I loved) as a high school teacher. I now pursue volunteering through SHARE'S National Ovarian Cancer Helpline and do outreach work for ovarian cancer awareness. (CS15)

To sum up, cancer survivors used many different words to describe the disease, treatment, medical personnel, and negative feelings. There is a greater variety of words used to describe negative emotional processes compared to positive emotional processes, possibly because negative emotions dominate in the denial, depression and acceptance stages whereas positive emotions are restricted to the acceptance stage.

5. DISCUSSION AND CONCLUSION

The analysis of the top 50 most frequently occurring words in the cancer narratives using the LIWC framework showed that experiences of coping with cancer is more of an emotional process rather than a cognitive process, the common stages of coping with cancer are denial, depression and acceptance, and acceptance may be a cognitive process.

Firstly, the traumatic cancer experiences is reflected in the dominance of words for negative emotional processes over positive emotional processes and cognitive processes. The dominance of emotional processes over cognitive processes concur with past studies on cancer narratives (Graves et al., 2005; Liaw et al., 2022; Martino et al., 2015; Owen et al., 2006; Smith et al., 2005). This emotional dominance indicates that patients are primarily engaged in affective rather than reflective or problem-focused coping. More importantly, the present study produced new findings, which is words can mark both positive and negative emotions (“life”, “time”, “work”, “new”, “long”, “over”, “story”). This is made possible with the use of a qualitative analysis of the written narratives after AntConc software was used to identify the 50 most frequently used words. Previous research using LIWC text application analysis have not mentioned the possibility of words carrying both positive and negative meanings, treating linguistic markers for positive and negative emotional processes as largely mutually exclusive. Our finding highlights the context-dependent nature of emotional expression in illness narratives, and indicate that emotional language is more fluid than previously assumed. Therefore, future investigations should integrate qualitative methods with corpus-based tools to accurately capture the meaning of illness narratives.

Secondly, in the context of the Kübler-Ross’s (1969) stage model of grieving, this study showed that denial, depression and acceptance are common stages in cancer narratives but bargaining and anger appear less frequently in cancer narratives. In addition, depression and acceptance are recurring stages, sometimes triggered by unexpected treatment outcomes and inability to return to life before the cancer. These findings are new because previous studies referred to the stages of grieving but do not specifically map out the trajectory of the stages. In particular, Chen and Zhao (2021) referred to stages of grieving but did not categorise the words for cognitive and emotional processes according to these stages. Instead, they categorised the words according to the stages of breast cancer. Chen and Zhao (2021) used Kübler-Ross’s (1969) model to explain that patients at Stage IV use more positive words and less negative and anxiety-related words because they have accepted the disease. The present findings on the recurrence of depression and acceptance highlights the difference between grieving the death of a loved one and grieving the loss of normalcy caused by cancer. Unlike bereavement, the cancer experience is often non-linear, marked by the possibility of relapse or metastasis, which can disrupt any clear progression through emotional stages.

Thirdly, by integrating approaches from linguistics and health psychology to understand cancer experiences, our study produced findings which suggest that acceptance is a cognitive process. The decline in emotional words and the increase in cognitive words from depression to acceptance suggest that cognitive mechanisms are utilised to reconstruct a new identity of a person who has battled and survived cancer. Schwartz and Drotar (2004) reported a decrease in negative emotion accompanying an increase in cognitive processing from the first to the third narrative written by caregivers of children with chronic illness, but does not specifically link the emotional and cognitive processing to the stages of coping with cancer. An increase in cognitive words in narratives reflects greater involvement in working on the emotional dimensions of events, including the ability to make choices and take on responsibilities (Freda et al., 2015). The ability to recognise and manage positive and negative experiences indicates ability to live with cancer. Shapiro et al. (1997, p. 549) emphasise “the importance of emotional experience, and the synthesis of cognition and affect in the construction of meaning”.

The study produced findings which are useful in healthcare contexts. Having linguistic clues to the stage of coping with cancer will help caregivers to respond appropriately. For example, when cancer patients use many cognitive words, caregivers can encourage them to think rationally about their experiences but when they use many negative emotion words, caregivers can respond with empathy (Liaw et al., 2022).

However, there are limitations which limit the generalisability of the findings. The sampling of cancer narratives is limited to 20 in the present study, and background information on the cancer patients cannot be provided to contextualise their sharing of experiences. Furthermore, as this study relied on written cancer narratives rather than interviews, it was not possible to determine whether cancer patients hardly experience the bargaining stage or it happens but is not included in the cancer narratives. Future research should consider using interviews to obtain more in-depth information on the stages of coping with cancer. In addition, interviews will also enable researchers to find out the duration of each emotional stage and confirm whether denial is brief (Falek & Britton, 1974) and depression is prolonged (Croson & Keim-Malpass, 2016). Future research incorporating interviews can offer deeper insight into the temporal aspects and potential recurrence of emotional stages, providing a more comprehensive understanding of the coping trajectory in cancer patients.

CONFLICT OF INTEREST

We declare no conflict regarding the publication of the study.

REFERENCES

Burns, V. 2017. Imperfectly moving towards acceptance. *PLAID: People Living with And Inspired by Diabetes, 2*(2), 12-17.

Cernvall, M., Carlbring, P., Ljungman, L., Ljungman, G., & von Essen, L. 2015. Internet-based guided self-help for parents of children on cancer treatment: A randomized controlled trial. *Psycho-Oncology, 24*(9), 1152-1158. DOI: 10.1002/pon.3788

Chen, M., & Zhao, L. (2021). Mapping breast cancer survivors' psychosocial coping along disease trajectory: A language approach. *Journal of Health Psychology*, *26*(13), 2563-2576. DOI: 10.1177/1359105320919893

Chou, W. Y., Hunt, Y., Augustson, E., & Folkers, A. 2011. Cancer survivorship in the age of YouTube and social media: A narrative analysis. *Journal Medical Internet Research*, *13*(1), e7. DOI: 10.2196/jmir.1569

Croson, E., & Keim-Malpass, J. 2016. Grief and gracefulness regarding cancer experiences among young women. *Oncology Nursing Forum*, *43*(6), 747-753. DOI: 10.1188/16.ONF.747-753

Falek, A., & Britton, S. 1974. Phases in coping: The hypothesis and its implications. *Social Biology*, *21*(1), 1-7. DOI: 10.1080/19485565.1974.9988084

Freda, M. F., & Martino, M. L. (2015). Health and writing: Meaning-making processes in the narratives of parents of children with leukemia. *Qualitative Health Research*, *25*(3), 348-359. DOI: 10.1177/1049732314551059

Freda, M. F., Esposito, G., & Quaranta, T. (2015). Promoting mentalization in clinical psychology at universities: A linguistic analysis of student accounts. *Europe's Journal of Psychology*, *11*(1), 34-49. doi: 10.5964/ejop.v11i1.812

Gotay, C. C. (1984). The experience of cancer during early and advanced stages: The views of patients and their mates. *Social Science & Medicine*, *18*(7), 605- 613. DOI: 10.1016/0277-9536(84)90076-5

Graves, A. W., Plasencia-Peinado, J., Deno, S. L., & Johnson, J. R. (2005). Formatively evaluating the reading progress of first-grade English learners in multiple-language classrooms. *Remedial and Special Education*, *26*(4), 215-225. https://doi.org/10.1177/07419325050260040401

Günay, U., & Özkan, M. 2019. Emotions and coping methods of Turkish parents of children with cancer. *Journal of Psychosocial Oncology*, *37*(3), 398-412. DOI: 10.1080/07347332.2018.1555197

Han, J. Y., Shaw, B. R., Hawkins, R. P., Pingree, S., McTavish, F., & Gustafson, D. H. 2008. Expressing positive emotions within online support groups by women with breast cancer. *Journal of Health Psychology*, *13*(8), 1002-1007. doi: 10.1177/1359105308097963

Inci, H., Inci, F., Ersoy, S., Karatas, F., & Adahan, D. (2021). Self-esteem, metacognition, and coping strategies in cancer patients: a case–control study. *Journal of Cancer Research and Therapeutics*, *17*(4), 956-962. DOI: 10.4103/jcrt.JCRT_618_19

Kahn, J. H., Tobin, R. M., Massey, A. E., & Anderson, J. A. (2007). Measuring emotional expression with the Linguistic Inquiry Word Count. *The American Journal of Psychology, 120*(2), 263-86. https://doi.org/10.2307/20445398

Kübler-Ross, E. 1969. *On death and dying*. Scribner.

Kübler-Ross, E., & Kessler, D. (2005). *On grief and grieving: Finding the meaning of grief through the five stages of loss*. Simon and Schuster.

Liaw, M. K. P., Ting, S. H., Chuah, K. M., & Jerome, C. (2022). Affective and cognitive processes in cancer narratives. *Manusya: Journal of Humanities*, *25*(1), 1-23. https://doi.org/10.1163/26659077-25020013

Martínez, I. A., Beck, S. C., & Panza, C. B. 2009. Academic vocabulary in agriculture research articles: A corpus-based study. *English for Specific Purposes, 28*(3), 183-198. https://doi.org/10.1016/j.esp.2009.04.003

Martino, M. L., Lemmo, D., Testoni, I., Iacona, E., Pizzolato, L., Freda, M. F., & Neimeyer, R. A. (2022). Anticipatory mourning and narrative meaning-making in the younger breast cancer experience: An application of the meaning of loss codebook. *Behavioral Sciences*, *12*(4), Article 93. https://doi.org/10.3390/bs12040093

Martino, M. L., Onorato, R., & Freda, M. F. (2015). Linguistic markers of processing trauma experience in women's written narratives during different breast cancer phases: Implications for clinical interventions. *Europe's Journal of Psychology, 11*(4), 651-663. DOI: 10.5964/ejop.v11i4.991

Masa'deh, R., Hall, C., & Collier, J. 2017. An exploration of the concepts of loss and grief as stress responses in Middle Eastern parents of children with cancer. *Global Journal of Health Science*, *9*(6), 97-106. https://doi.org/10.5539/gjhs.v9n6p97

Nilsen, M., Stalsberg, R., Sand, K., Haugan, G., & Reidunsdatter, R. J. (2021). Meaning making for psychological adjustment and quality of life in older long-term breast cancer survivors. *Frontiers in Psychology*, *12*, 734198. DOI: 10.3389/fpsyg.2021.734198

Owen, J. E., Giese-Davis, J., Cordova, M., Kronenwetter, C., Golant, M., & Spiegel, D. (2006). Self-report and linguistic indicators of emotional expression in narratives as predictors of adjustment to cancer. *Journal of Behavioral Medicine*, *29*(4), 335-345. DOI: 10.1007/s10865-006-9061-8

Pennebaker, J. W., Boyd, R. L., Jordan, K. N., & Blackburn, K. (2015) The development and psychometric properties of LIWC2015. DOI:10.15781/T29G6Z

Rutherford, B. A. (2005). Genre analysis of corporate annual report narratives: A corpus linguistics–based approach. *The Journal of Business Communication, 42*(4), 349-378. https://doi.org/10.1177/0021943605279244

Salander, P. (2002). Bad news from the patient's perspective: An analysis of the analysis of the written narratives of newly diagnosed cancer patients. *Social Science & Medicine, 55*, 721-732. DOI: 10.1016/s0277-9536(01)00198-8

Schwartz, L., & Drotar, D. (2004). Linguistic analysis of written narratives of caregivers of children and adolescents with chronic illness: Cognitive and emotional processes and physical and psychological health outcomes. *Journal of Clinical Psychology in Medical Settings, 11*, 291-301. https://doi.org/10.1023/B:JOCS.0000045349.10034.62

Seale, C., Ziebland, S., & Charteris-Black, J. (2005). Gender, cancer experience and internet use: A comparative keyword analysis of interviews and online cancer support groups. *Social Science & Medicine, 62*(10), 2577-2590. https://doi.org/10.1016/j.socscimed.2005.11.016

Shapiro, S., Angus, L., & Davis, C. (1997). Identity and meaning in the experience of cancer: Three narrative themes. *Journal of Health Psychology*, *2*(4), 539-554. DOI: 10.1177/135910539700200410

Smith, S., Anderson-Hanley, C., Langrock, A., & Compas, B. (2005). The effects of journaling for women with newly diagnosed breast cancer. Psycho-Oncology: *Journal of the Psychological, Social and Behavioral Dimensions of Cancer*, *14*(12), 1075-1082. DOI: 10.1002/pon.912

Stamatatos, E., Fakotakis, N., & Kokkinakis, G. (2000). *Text genre detection using common word frequencies*. In Proceedings of the 18th conference on Computational linguistics-Volume 2 (pp. 808-814). Association for Computational Linguistics.

Tausczik, Y. R., & Pennebaker, J. W. (2010). The psychological meaning of words: LICW and computerized text analysis methods. *Journal of Language and Social Psychology, 29*(1), 24-54. DOI:10.1177/0261927X09351676

Telford, K., Kralik, D., & Koch, T. (2006). Acceptance and denial: Implications for people adapting to chronic illness: Literature review. *Journal of Advanced Nursing, 55*(4), 57-64. DOI: 10.1111/j.1365-2648.2006.03942.x

Unal, I. O., & Ordu, C. (2023). Alexithymia, self-compassion, emotional resilience, and cognitive emotion regulation: charting the emotional journey of cancer patients. *Current Oncology*, *30*(10), 8872-8887. DOI: 10.3390/curroncol30100641

Wilson, A. 2016. “Survivor Gene”: Navigating survivorship and the strong Black woman among African-American breast cancer survivors in Los Angeles, California. [Unpublished undergraduate honors thesis, University of Colorado].