Bachelor Thesis

Referential Activity in the E-Therapy Program "Look at

Your Drinking" – A Text-Mining Approach

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Date: 28.06.2019

Abstract

Introduction: The verbal exchange between therapist and client in the psychotherapeutic setting provides opportunities to express emotions, thoughts, intentions, and motivations. Analysing linguistic properties in the verbal exchange of client and counsellor can be helpful in understanding the process and outcome of psychotherapy. One psycholinguistic variable related to the process and outcome of psychotherapy is referential activity (RA). RA is the degree to which a person expresses nonverbal experience, such as emotions, imagery and bodily experience, verbally. Patterns of RA were identified in an online therapy setting focusing on the timing of the program, clients who completed or stopped prematurely, and whether counsellors and clients displayed synchronicity in their levels of RA.

Method: The data was retrieved from the online program "Look at your drinking". The sample consisted of nine English speaking clients and the email sequences between the clients and counsellor were analysed. The emails were analysed by using the Weighted Referential Activity Dictionary (WRAD) from the Discourse Attributes Analysis Program (DAAP). The WRAD provides the DAAP with a weighted list of words, whereas the DAAP calculates the RA scores of given text sequences. Patterns of RA were identified in all cases.

Results: First, seven out of nine clients scored highest on referential activity at the beginning of the program, whereas two clients scored highest at the end of the program. Second, two clients who completed the program are within top four of the highest referential activity measured. Third, synchronicity between client and counsellor referential activity was mostly visible at the beginning of the program and less towards the end of the program.

Conclusion: This study shows that RA can be meaningfully detected in digital data and therefore, can be used as a variable to assess process and outcome of an e-therapy program. Further research about the three findings of this study should be conducted to gain a deeper understanding of what makes a program effective and to provide the counsellor with an effective tool to access and monitor the progress and possible outcomes of the e-therapy.

Key words: progress, outcome, e-therapy, referential activity, problem drinkers

Referential Activity in the E-Therapy Program "Look at Your Drinking"

The verbal exchange between therapist and client is the basic material of every psychotherapy session (Anderson, Bein, Pinnell, & Strupp, 1999). According to Tausczik and Pennebaker (2010), language gives the opportunity to express internal emotions and thoughts, motivations and intentions and thus, to become understandable for other people. A domain of psychology that focuses on, and supports the importance of language in the psychotherapeutic setting is narrative psychology. Pennebaker and Seagal (1999) refer to narrative psychology as telling a story, which is based on events that happened in life. According to them, using language to construct stories helps to process disturbing life events which in turn results in less rumination and therefore disappear from conscious thought. In order to understand how language influences the process and outcomes of psychotherapy, a closer examination of linguistic properties is vital. Especially, applying linguistic analyses to the online psychotherapeutic setting could provide new insights about which aspects make an online therapy program effective.

The analysis of linguistic properties started already over 30 years ago and is still a fast evolving field (McCarthy, Mergenthaler, Schneider, & Grenyer, 2011). Linguistic properties provide a unique perspective to gain a deeper understanding of the communication in the clinical setting and help to find out how language changes within the process of psychotherapy (McCarthy, Caputi, & Grenyer, 2017; McCarthy et al., 2011). According to Pennebaker and Seagal (1999), the processing and articulation of emotions is a linguistic feature, which plays a crucial role in this context as it is associated with improving physical and mental health. Similarly, Bucci (2013) found that the expression of emotional experiences in written and spoken texts is connected to the process and outcome of psychotherapy.

In the psychotherapeutic context, written and spoken texts include transcripts of therapy sessions and free writings of the client, such as diary entries, written assignments, or email conversations (Hoogendoorn, Berger, Schulz, Stolz, & Szolovits, 2017). This means

that researchers are confronted with large corpora of texts that need to be analysed. Methodically, a useful method in this setting are text mining approaches as they are capable of analysing large amount of texts (Abbe, Grouin, Zweigenbaum, & Falissard, 2015).

Text Mining Approaches

According to Abbe et al. (2015), techniques from computer science, statistics linguistics are applied in text mining (TM) in order to discover, retrieve and extract specific information from given texts. Depending on what kind of information wants to be retrieved, the following approaches of text mining can be used.

First, it is possible to focus on counting the appearance of words in texts (Hoogendoorn et al., 2017). According to Mergenthaler and Bucci (1999), this can also be referred to as computer aided text analysis. Thereby, a dictionary is being generated, which covers aspects of a topic or already complex topics. When applying the developed dictionary to a text, the program scans the target text word by word and compares it to the dictionary (Mergenthaler & Bucci, 1999).

A second approach is to assign words into categories, to count the words which belong to these categories, and to identify topics in a given text (Hoogendoorn et al., 2017). This method is dictionary based, which means that an already developed dictionary, containing word categories, is required. In this approach, target words are scanned and matched with a word of a dictionary. In case an appropriate match is found, the word will be assigned to the certain word category (Pennebaker, Boyd, Jordan, & Blackburn, 2015). After the text has been analysed, the size of the word categories can be compared.

Third, it is possible to pair terms with each other in order to receive a "domainspecific ontology" (Hoogendoorn et al., 2017, p. 1449). This process is often referred to as topic modelling. Programs analyse texts and compare each word with given dictionaries. Thereby, means of the usage of words are calculated (Maskit & Bucci, 2007), topics can be identified and conclusions about the given texts can be drawn.

So far, text mining approaches have been applied to diverse domains of psychology. Most interesting, multiple researchers made important discoveries in the field of research on what influences the process in psychotherapy by using text mining approaches. For example, McCarthy et al. (2017) used a text mining approach to show that the behaviour of the client, as well as emotion and cognition play an important role in the process of psychotherapy, and the combination can result in significant change moments in psychotherapy. Text mining approaches have also been used for research regarding emotional and abstraction language in the therapeutic process and led Mergenthaler (1996) to propose the Therapeutic Cycles Model (TCM). Connected to the research conducted by Mergenthaler, Maskit and Bucci (2007) concentrated their research on non-verbal and emotional experiences and how they are expressed in the clients' language. This is being referred to as referential activity and provides information about how intense a person engages in, for example, psychotherapy and therefore, allows for insights into the clients' process and the effectiveness of the therapeutic work (Maskit, Bucci, & Murphy, 2015).

This means that TM approaches have already been successfully applied to research on process and outcome in psychotherapy. Most research on text mining approaches up to date has focused on analysing textual data from face-to-face therapies. Considering the increase in offers of online therapy, a new field of research evolves. Taking into account these findings, this study aims at extending previous research by combining text mining approaches with data from online psychotherapy programs. Specifically, as referential activity provides a method for measuring the emotional engagement of the client in therapy, it could help counsellors with important insights about the effectiveness and progress of the online therapy program.

Referential Activity

Referential Activity (RA) is a psycholinguistic variable which can be defined as "the degree to which language is connected to nonverbal experience, including bodily experience, imagery and affect" (Mariani, Maskit, Bucci, & De Coro, 2013, p.431). People vary in the

amount of RA that is included in their narratives. In the psychotherapeutic context these narratives consist of stories formed by the client in which they delineate past events (Pennebaker & Seagal, 1999). According to Bucci & Maskit (2006), a high level of RA can be recognized by a specific and vivid language style, which evokes similar experiences in the reader or listener, whereas low RA can be identified as vague, general, and abstract language.

According to Bucci et al. (2016), the level of RA can be determined on the basis of four aspects. First, the specificity of language is being assessed, by means of the amount of detail. Second, the clarity is determined, based on the specific organisation and focus of topics in the language. Third, the concreteness is judged by the person's degree to refer to bodily experiences and fourth, imagery that the language of a person evokes is being assessed. The assessments of all four dimensions result in a score which is related to the ability to connect emotional, linguistic and cognitive experiences (Bucci et al., 2016). The level of RA in verbal or written texts provides insights into the clients' amount of engagement in psychotherapy and is connected to information about the effectiveness of treatment (Maskit & Bucci, 2007).

According to Bucci and Maskit (2006), high RA is mostly present in in narratives or detailed descriptions. This has also been supported by other researchers, as they also see RA being present in narratives and being associated with positive treatment outcome (Lo Verde, Sarracino, & Vigorelli, 2012; Maskit et al., 2015). Specifically, oscillation of high and low scores of RA are an indicator for a positive psychotherapeutic process (Lo Verde et al., 2012). Additionally, RA is the main component of the symbolizing phase of the referential process (Bucci et al., 2016), but can also be used as a general measurement of the referential process (Maskit & Bucci, 2007).

Measuring RA can, therefore, provide useful insights into the effectiveness of treatments and can help therapists to better understand how their therapy can be most valuable for a client. Most research up to date has focused on RA in the context of transcripts of therapy sessions or other written texts. Considering the increase in offers of online therapy in

today's society, this study aims to investigate the role of RA in the context of online psychotherapy.

Online Psychotherapy

Online psychotherapy, also referred to as e-therapy, can be defined as the "active involvement of a therapist, and as a consequence the formation of an ongoing, helping relationship between therapist and patients, which can take place purely via Internet communication" (Postel, de Haan, & De Jong, 2008, p. 708). Online psychotherapy gives the counsellor the unique opportunity to receive continuous feedback about the process by monitoring the progress (Hoogendoorn et al., 2017). The majority of online psychotherapy takes place via e-mail contact between client and therapist (Rochlen, Zack, & Speyer, 2004). Therefore, a crucial characteristic with consequences for the therapy is that e-mail writing is asynchronous. This means that the communication between client and therapist do not take place in real time and depends on whenever the client or therapist has time to respond (Rochlen et al., 2004). Therefore, a synchronous contact has various impacts on the therapy.

According to Rochlen et al. (2004) and Suler (2000), asynchronous communication gives the opportunity to engage in a deeper state of self-reflection and ownership of the situation as no immediate response is expected. Detailed attention can be paid to both the process and writing. Especially, the client gets the opportunity to set the parameters of selfdisclosure as they can set the tone and pace of the discourse of therapy (Rochlen et al., 2004).

Nevertheless, asynchronous contact also brings challenges. It alters the nature of the process in comparison to face-to-face therapy (Rochlen et al., 2004; Suler, 2000). For example, the spontaneity in interacting with each other is lost, and therefore, additional information that spontaneity can provide about a person is not given (Suler, 2000). Some clients might also take delays in responses personal, which can increase anxiety (Rochlen et al., 2004).

Even though disadvantages are apparent, e-therapy has already been proven to be effective for different mental health problems (ten Doesschate & Hodiamont, 2007). A variety of programs already exist that offer online treatment for addiction disorders.

E-therapy and addiction disorders

Clients with addiction disorders, especially problem drinkers, form a special group of patients. Postel, De Haan, Ter Huurne, Becker, and De Jong (2010), define problem drinkers as people who drink at least 15 to 22 units¹ of alcohol a week, depending on the gender. In the Netherlands, only a total of 10% of the problem drinkers received appropriate professional help from an addiction treatment service in 2006 (Postel, De Haan, & De Jong, 2010). Specifically, people who suffer from alcohol addiction or dependence show the widest treatment gap in mental health care with a percentage of 78 (Kohn, Saxena, Levav, & Saraceno, 2004), which is believed to be due to people not reporting their problems because they are feeling ashamed or are anxious about stigmatization (Cunningham & Breslin, 2004; Postel, De Haan, & De Jong, 2010). E-therapy programs targeted to problems drinkers are therefore an alternative to face-to-face psychotherapy with the advantage that they can usually be completed anonymously and, in terms of effort, are easier to start.

One existing program that provides online help for people with problematic drinking behaviour as well as online psychotherapy is "Look at your drinking". According to Postel, De Haan, and De Jong, (2010), the program targets everyone over the age of 18 who is concerned about their own drinking behaviour. The main objective of this program is to motivate people to change their drinking behaviour by reducing or even stopping it. This is hoped to be achieved by providing a two-parted program which contains different assignments and treatment phases. Communication during this program is asynchronous and clients stay anonymous.

¹ 10ml of pure alcohol (ethanol) equals one unit of alcohol (NHS Choices, 2015)

Research on online therapy outcome and process

So far, some findings exist on the relationship between the quality of relationship between client and therapist on the outcome of online psychotherapy (Cameron, Rodgers, & Dagnan, 2018; Cook & Doyle, 2002; Elvins & Green, 2008). However, further research on what influences the outcome or process of online psychotherapy is limited.

Mallen, Jenkins, Vogel, and Day (2011), for example, conducted research about the process in synchronous chat environments in online counselling from the perspective of a counsellor-in-training and found that their intervention was similar to face-to-face sessions and only small changes in used language were identified. Hoogendoorn et al. (2017) conducted research about how therapists can predict positive treatment outcome of social anxiety disorders by analysing email conversations. Therefore, the use of text analysis in online therapy seems to have great potential as it provides the counsellor with feedback, which can be used to evaluate the progress of the therapy.

Conducting research in the field of online psychotherapy and especially about the process itself can help to minimize and understand the disadvantages in more detail and to find out what exactly makes online treatment effective. Thereby, focussing research on data from alcohol addiction treatments could help in understanding what makes online treatment effective and to improve the treatment for that specific group.

Research Questions

Previous research showed that it is useful to look at linguistic features in the online psychotherapeutic setting (Bucci, 2013; McCarthy et al., 2017; Mergenthaler, 1996). Especially, Bucci (2013) who conducted research about RA provides a clear method to assess client's engagement in psychotherapy and therefore, provides important insights into the process of therapy. As the new field of online psychotherapy develops further, analysing RA in an online therapeutic setting allows for new insights. Ideally, RA can be used as the indication of the effectiveness in relation to the client's involvement in psychotherapy (Maskit

& Bucci, 2007). Methodically, the most useful measures to assess RA in large corpora of texts are TM approaches.

So far, TM approaches have been applied to transcripts of face-to-face psychotherapy session, whereas analyses in the e-therapy context are scarce. As effective addiction therapy programs already exist, applying a TM approach to such a program could yield interesting results. As the program consists of two parts, it becomes interesting to find out about the appearance of RA in the two different parts. Besides that, as RA is related to process and effectiveness of therapy (Maskit & Bucci, 2007) and drop-out rates in e-therapy programs are generally high (Postel, 2011), RA scores could give indications about the likelihood of a client to complete or end the program prematurely. Lastly, a commonly used skill of counsellors in face-to-face psychotherapy is to display similar mimics and gestures of the appeutic setting such skills cannot be applied. However, as RA is related to the process of therapy (Maskit & Bucci, 2007), it becomes of interest to find out whether the amount of RA that a counsellor uses also has an influence on client's level of RA and therefore on the process of therapy. Throughout the study, the act of displaying similar RA patterns will be referred to as synchronising.

This leads to the following overall research question: What is the nature of RA in the discourse of the online psychotherapy program "Look at your drinking"? More specifically:

- a. How does the referential activity of clients occur in the two phases of the program
 "Look at your drinking?"
- b. How does the referential activity differ between clients who completed the program and clients who stopped prematurely?
- c. Can synchronicity in the referential activity from client and counsellor be identified?

Method

For the purpose of the study, data from a psychological online program was analysed in order to identify patterns of referential activity. The data has been retrieved from the English e-therapy program "Look at you drinking". This program is based on the Dutch program AlcohoolDeBaas, which was established in March 2015 by Tactus Verslavingszorg (Postel, De Haan, & De Jong, 2010). The aim of this program is to offer treatment to everyone over 18 who is concerned about their drinking behaviour and motivated to change it. The program consists out of two parts: the first part, focuses on the drinking habits of the client and the second, on changing the client's behaviour (Postel, De Haan, & De Jong, 2010). According to Postel et al. (2010), the program is supposed to help and motivate people to reduce their drinking behaviour or to stop alcohol intake completely. The communication throughout the program between client and counsellor is asynchronous, via the Internet.

Sample

The sample of this study was provided by the psychiatric institution Tactus addiction care and consisted of participants who took part in the online program 'Look at your drinking'. All participants were asked by Tactus for the consent to collect their data and were informed about the research purpose that their data was used for.

The sample included the data sets of nine clients and consisted out of three male and six female clients, ranging from an age of 27 to 59, with a mean age of 43.67. All participants lived in the United Kingdom and were English speaking.

Data

The data encompasses nine e-therapy sequences which consist of email conversations between the client and counsellor. Topics and contents of the emails that are sent by the counsellors are in a specific order, standardized, and pre-formulated. Depending on the part of the program and content, the emails are adapted and tailored individually to the client. In addition to the email conversations, the client is asked to complete assignments in order to proceed in the program.

The first two emails are standardized emails sent automatically by the organization and coordinator of the program. Afterwards, the emails are sent by the counsellor. The first part of the program covers the topics 'Advantages and Disadvantages', 'Keeping an alcohol logbook', and 'Analysing drinking situations'. The second part of the program asks the client to set drinking targets and goals. Afterwards, the topics of the emails cover 'breaking habits', 'thinking differently Part 1 & 2', 'Acting different', 'Decisions' and 'Action plan'.

In case clients completed the action plan, the counsellor sends further emails with the topics of 'Conclusion' and 'Follow up'. Between the topics that have been mentioned, the therapist provides feedback to the client and responds to personal messages of the client. In case additional problems arise, the therapists include further premade emails, for example, if a client has an excessive intake of alcohol or many physical problems, the therapist sends a letter for the client's doctor. In case the client is frustrated or unsure about continuing, the therapist will send an email about reasons to continue with the program. Besides that, the therapist provides the client with additional information about certain topics, which fit to the content of the emails that have been sent. These emails have the title 'Food for thought' and contain, for example, information about 'celebrating without alcohol', 'perfectionism', 'cravings', and many more.

The clients respond to the specific topics either by responding via writing an email to questions asked, completing assignments, for example, filling out questionnaires, and completing the drinking log, which asks the client to provide information about specific situations where the person experiences cravings, thoughts, and feelings. Sometimes, the client also provides further information about himself, by writing his own emails concerning, for example, information about his living history, or other concerns.

Analysis

The data analysis was conducted with the use of the Discourse Attributes Analysis Program and the Weighted Referential Activity Dictionary.

Discourse Attributes Analysis Program (DAAP). The Discourse Attributes Analysis Program (DAAP) is a computer-based text analysis program, which was developed by Bernard Maskit (The Discourse Attributes Analysis Program, 2017; Bucci & Maskit, 2006). The aim of the DAAP is to visualize texts in graphical outputs in order to find linguistic predictors for psycholinguistic variables (DAAP, 2017).

The program is able to make use of unweighted and weighted dictionaries. Specifically, the DAAP matches the words included in a text and compares the text with a chosen (unweighted) dictionary to calculate proportions (DAAP, 2017). Additionally, the DAAP is able to make use of weighted dictionaries and measures scores with a mathematical smoothing operator to compute proportions. In this context, smoothing refers to the ability of the program to produce scores, which are called 'moving weighted average', which tracks the different word usage (DAAP, 2017). Thereby, the average scores of the weighted dictionary are calculated from, for example, word number 200 through 400. Following that, the average scores of word number 201 through 401 are calculated, and so on. The graph appears to be smooth by providing a graphical overview of changes in language based on average scores (DAAP, 2017). A dictionary that is being used with the DAAP is the weighted referential activity dictionary.

Weighted Referential Activity Dictionary (WRAD). The Weighted Referential Activity Dictionary (WRAD) is a word list that contains 696 items (Bucci & Maskit, 2006). The dictionary was developed to identify referential activity (RA) in a text. RA is measured in texts, which can include spoken or written language. The items of the dictionary are weighted ranging between -1 and +1; -1 indicates that the item does not display any RA and +1 indicates a high level of RA for that item (Bucci & Maskit, 2006). As mentioned, language of low RA is often general, diffuse, abstract, or vague, whereas language of high RA is specific, vivid, full of imagery, and evocative (Bucci & Maskit, 2006; Bucci et al., 2016). Mainly, the items that are included in the dictionary are commonly used words. Articles, pronouns,

conjunctions, and prepositions make up approximately 85% of the tokens (number of words) in spoken or written texts (Bucci et al., 2016). As a results, RA does not depend on specific content (Bucci & Maskit, 2006).

Past research on correlations between trained judges who score RA and the WRAD show that the validity of the WRAD is high (The Weighted Referential Activity Dictionary (WRAD), 2017). Besides that, by using the WRAD it is possible to identify physiological characteristics of the speakers, for example, when the speaker varies with the pitch of the voice. The WRAD is also able independently measure a person's level of narration and parts of the episodic memory. Figure 1 provides an example of how RA is measured. Highly weighted RA (score of 0.5 to 1) words are coloured in dark red, low RA (score of -1 to -0.5) coloured in blue, neutral RA words (scores of -0.5 to 0.5) in orange, and words which are not included in the WRAD are black.

In the late summer of that year we lived in a house in a village that looked across the river and the plain to the mountains. In the bed of the river there were pebbles and boulders, dry and white in the sun, and the water was clear and swiftly moving and blue in the channels. Troops went by the house and down the road and the dust they raised powdered the leaves of the trees. The trunks of the trees too were dusty and the leaves fell early that year and we saw the troops marching along the road and the dust rising and leaves, stirred by the breeze, falling and the soldiers marching and afterward the road bare and white except for the leaves.

Figure 1. Example of RA measured with WRAD

Note. Retrieved from Bucci, W., & Maskit, B. (2006). Building a weighted dictionary for referential activity. *Computing Attitude and Affect in Text: Theory and Applications*, 20. Doi:10.1007/1-4020-4102-0

According to WRAD (2017), when using the WRAD in combination with DAAP, it provides DAAP with a weighted list of words. Based on that, DAAP calculates RA scores of the given text, which can be used for further analyses. Currently, the WRAD is the only functioning weighted dictionary that is available (WRAD, 2017). Therefore, it is required to use the WRAD together with the DAAP.

Procedure

Before the data was analysed several routines were used to anonymize the data. Names, (birth) dates, places, and names of the client's businesses were removed and were replaced by abbreviations. For example, names of clients and therapists were replaced by the abbreviation 'PER', week days were replaced by the abbreviation 'DAY', and locations were replaced by 'LOC'. To ensure that the data stays anonymized, approval forms for researchers have been established, which needed to be signed to ensure confidentiality and anonymity. Additionally, to ensure anonymity of the client and therapist, the data has been transferred to a USB-Stick, which has been secured by a password, only available to the researcher.

Furthermore, the data was normalized in order to ensure identical structure and data consistency. Punctuations were split from the words and capitals, bold texts, and italic words were removed from the data.

Besides that, additional changes were made to the data and dictionary in order to facilitate the analysis. First, the word "fancy" was included in the dictionary, as the sample was British and five out of nine clients used this word in their emails. Second, two clients responded to the counsellor by copying their emails and adding their responses in capital letters or in bold/italic letters. Therefore, the answers of those clients were separated from the counsellor's email, to ensure that only the amount of referential activity of the client was measured.

Results

In the following sections the results of the study are presented. In the first part, the nine different cases will be briefly described to provide an overview. In the second part, includes general information about the sample that is presented. The third part, includes the results, which have been obtained by using the WRAD and DAAP.

Case Description

In the following paragraphs, the different cases will be shortly described based on the self-reported information of the clients. Therefore, demographic data of the client is provided as well as the reasons for participating in the program, the amount of alcohol the client consumes (in units), since when the client drinks a significant amount of alcohol, and the reasons for drinking alcohol on a regular basis. Besides that, information is provided about the physical health of the client, and the consequences the client experiences because of the alcohol consumption. The case descriptions are based on own analyses of the data and the case descriptions provided in the master's thesis by Krstić (2019).

Case one. The client is a female and 38 years old and lives together with her partner. At the beginning of the programme, the client drank 62 units of alcohol a week. The client has a 10-year history of alcohol consumption and the main reason the client applied for the program is that she believes that she is drinking too much alcohol on a regular basis. Therefore, her goal was to reduce her drinking. As motivation for her application, the client states that she feels like she is not getting most out of her life, because of gaps in her memory from special events when she drank alcohol. She also reported negative consequences from her alcohol consumption. For example, she experienced physical problems as digestion problems and feels despondent or depressed, but also consequences at school. A further aspect that motivates her to reduce or stop her drinking is that she is overweight and that drinking will keep her from losing weight. Most of the times the client drinks with her partner in the evening or when she is at social gatherings.

Case two. The second client is a 49-year old woman, who works at part-time job and lives alone and drinks alcohol when she comes home from work in the evening. She applied for the program because she believes that she is drinking too much alcohol. At the beginning of the programme she reported to drink 50.6 units of alcohol per week. The client drinks in order to alleviate anxiety, stress, isolation, and boredom. The client reports that her mood worsened and that she often feels depressed. She also experienced suicidal thoughts once or

twice but explained that she did not experience them at the start of the programme. The client reports that she has lost her career and everything that was important to her four years ago but that she built herself up again. Currently she feels like she is losing everything again, which increased her alcohol intake. What motivates her to participate in this program is that she was already alcohol free for two years and therefore, she believes that she can do it again. Her goal by participating in the program is to stop drinking alcohol.

Case three. The client is male, 49-year old and has a 25-years drinking history. At the beginning of the program, the client drank 50 units of alcohol per week and had no alcohol free-days. He always drinks in evenings after work and at social gatherings. The client lives with his wife and his two children. The client applied for the program because he believes that he is drinking too much. He reports physical and psychological symptoms, for example, he often experiences tiredness and has memory problems (does often not remember evening from day before), mood swings, sexual problems, and feels depressed or despondent. Drinking helps him to relax, overcome boredom, and to enjoy himself. His wife also drinks alcohol regularly and it would motivate him to stop drinking if she also quits the drinking. The client describes himself as being overweight, which he assigns to drinking alcohol. The goal for him by participating in the program to drink less and to be able to learn how to prevent excessive drinking in the future.

Case four. The fourth case is a 38-year-old man, who lives with his partner and his three-year-old son. The client reports a 11-15 years drinking history and that the general intake of alcohol started already during his early youth. The client explains that these habits have grown since that time. At the beginning of the program, the client consumed 30.8 units of alcohol per week. The client consumes alcohol alone in the evenings, after work and when his son is asleep. The reasons for drinking alcohol are that it helps him to relax, to comfort himself and to calm down. He often experiences headaches throughout the day, which he assigns to the alcohol consumption. He also, experiences other physical symptoms as

digestion, memory, and sexual problems. At work, he experienced impaired work performance. The reason he applied for the program is that he thinks he is drinking too much. His aim, by participating in the program, is to drink less and to only drink at social gatherings and not when being alone. His son is an important motivational factor for him.

Case five. The client is a 27-year-old woman, who lives together with her husband, and has a six-years drinking history. The reason for her application to the program is that she thinks she is drinking too much alcohol. At the beginning of the program the client drank 32 units of alcohol per week. The drinking behaviour started with her work, where she often socializes with her colleagues and have regularly drinks together. Besides that, her husband also drinks alcohol regularly. The client also often drinks at social gatherings with family and friends. Her reasons why she is drinking is that it helps her to be more confident, to relax, and to lose her appetite. She explains that she has been binge eating and dieting for 10 years and that especially after evenings of drinking she binges a lot of food, which counteracts her dieting. The client often experiences memory problems, headaches, and stomach pains. The client is an active person, in her free time, she meets with family and friends, studies and enjoys different hobbies. Her aim by participating in the program is to to learn how to prevent relapses of drinking too much.

Case six. The sixth case is about a 59-year-old women who lives alone and has a three year history of increased alcohol intake. The client applied to the program because she thinks that she is drinks too much alcohol. At the beginning of the program she drank 41.3 units of alcohol per week. The client grew up in a family that drank occasionally and that she has started to drink alcohol since a young age. Some years ago, the client had an accident and found help in a spiritual path, which is very important to her. She was able to control her intake but three years ago she started to lose the connection to the spiritual path. This was the time when her amount of drinking increased significantly according to her. Furthermore, the client consume alcohol because it numbs her emotional pains and it makes her less sombre.

Due to the amount of drinking, the client delivered impaired performance at work. The client also often experiences physical symptoms as tiredness/fatigue and numbness/tingling. While participating in the programme, the client wants to achieve to drink less.

Case seven. The client is female, 43 years old and lives together with her three children. The reason she applied to participate is that other people think that she is drinking too much alcohol. According to her, she drank 50.8 units of alcohol at the beginning of the program. She explains that she drinks alcohol in the evening when she comes home from work, as her workdays are always stressful. Drinking helps her to relax, calm down and she likes the taste of alcohol, especially wine. The client has been drinking large units of alcohol for ten years. Her goal is to stop drinking alcohol, learn how to prevent drinking large amounts of alcohol again and to only drink at social gatherings. The client sometimes experiences physical symptoms as a result of her alcohol consume. For example, she feels despondent or depressed, has memory problems, sweats, experiences numbness/tingling or tiredness/fatigue. A further factor that led her to seek profession help is the partner of the client who is against drinking alcohol. He set her an ultimatum, which puts pressure on her. Her children are also against her drinking alcohol.

Case eight. The client is male and 48 years old. The client drinks regularly since his late teens, which means he has a drinking history of 21-25 years of alcohol consumption. The reason the client applied for the programme is that he thinks he is drinking too much alcohol. At the beginning of the program he drank a total of 105.6 units of alcohol. The reason he is drinking alcohol is that it helps him too relax, be less anxious and to numb emotional pain. He explained that drinking alcohol feels like "self-dosing medication". Next to his alcohol consumption, the client suffers from depression, high blood pressure, and high cholesterol, for which he is also taking medication. The goal by participating in the program is too drink less and to learn how to prevent drinking too much. The reason is that he wants to decrease his alcohol intake because of his physical and psychological health.

Case nine. The last client is female and 42 years old. She applied for the program because she believes that she is drinking too much alcohol. The client has a drinking history of 21-25 years and at the beginning of the programme she drank approximately 63 units of alcohol. However, throughout the program it became apparent that the client drinks as high as 93 units of alcohol a week. The reason she consumes regularly alcohol is that she feels cosier, has more fun, feels better about herself, and that she only experiences a short hangover. The client experiences often physical symptoms as tiredness/fatigue and joint/bone pains. Besides that, she experiences consequences of alcohol intake at work. Overall, the drinking behaviour of the client can be linked to socializing. By participating in the program, the client wants to achieve to drink less and to learn how to prevent too drink too much again.

Descriptive Analysis

All nine participants completed the first part of the program and participated in the second part of the program. However, only two out of nine clients completed the program and received follow-up emails. Three other participants participated in the program until 'Breaking habits' and two participants completed the part 'Action plan'. One client stopped the program after the part about 'Decisions' and one participant after 'setting drinking targets'. The contact with all participants ended because of their inactivity in the program.

The amount of alcohol intake of the nine clients, during the first week of the program, ranges from 30.8 to 105.5 units of alcohol ($M_{alcohol} = 54.50$ units, $SD_{alchol} = 22.41$ unit). The total number of exchanged emails varies in the cases between 28 and 66 emails ($M_{total emails}$ = 46.89, $SD_{total email} = 9.41$). In Table 1, an overview of the number of sent emails is given, by providing the amount of emails written by the client and the therapist. Table 1

Case	Alcohol intake	Number of	Number of	Total number of
	in units	emails sent by	emails sent by	emails sent
		client	therapist	
1	62	7	21	28
2	55	13	31	44
3	50	17	33	50
4	30.8	15	26	41
5	32	13	35	48
6	41.3	23	43	66
7	50.8	12	33	45
8	105.6	20	30	50
9	63	19	32	51
Total	490.5	139	284	423
Mean	54.5	15.44	31.56	47
SD	22.41	4.85	6.04	10.04

Overview alcohol intake and email exchange between client and therapist

Results obtained using WRAD and DAAP

Since the aim of the study was to identify patterns of referential activity in email conversations in the e-therapy program "Look at your drinking", referential activity was analysed using the DAAP and WRAD. The scores of RA vary between low and high during the process of the program. The average RA scores of an email sent by the counsellors range from -0.10 to -0.07 with a standard deviation between 0.08 and 0.09. The client's average RA score varied between -0.06 and 0.00 with a standard deviation ranging from 0.06 to 0.1. This indicates rather low RA scores. However, positive RA scores were identified in all nine cases throughout the whole program. Table 2 provides an overview of the mean scores and standard deviations of RA from client and counsellor in each case.

Table 2.

	Client		Counsellor	
Case	Mean RA	SD RA	Mean RA	SD RA
1	0.00	0.06	-0.10	0.09
2	-0.03	0.08	-0.08	0.08
3	-0.01	0.07	-0.07	0.09
4	-0.04	0.08	-0.09	0.09
5	-0.06	0.07	-0.09	0.08
6	-0.02	0.08	-0.09	0.09
7	-0.02	0.08	-0.08	0.09
8	-0.01	0.1	-0.07	0.08
9	-0.06	0.09	-0.09	0.09

Mean and SD scores of RA from client and counsellor

Note. SD = Standard Deviation

RA in the different phases of the program. The first research question was concerned with the nature of referential activity of clients in the two phases of the program "Look at your drinking". According to the data obtained by the analysis, the RA scores of the clients varied throughout the different phases of the program. Thereby, the highest peaks of RA have been scored at different moments. In seven out of nine clients, the RA score peaked in the first part of the program. Figure 2, provides and overview of the discourse of RA from the third client. The figure of client three is being used as he exemplarily demonstrates the peak of RA during the first part of the program.



Figure 2. Summary RA of clients from cases 3.

Figure 2 displays the overview of RA in the emails that have been sent by the client from case three. The x-axis represents the total number of tokens sent throughout the program and the y-axis indicates the RA scores. The client from case three scored highest on RA during the first email that he sent to the counsellor. His email was an answer to an email that has been sent by the counsellor, who responded to the intake questionnaire that was filled out by the client before he started the program and by asking additional questions. Therefore, the client answered in his email to the questions of the counsellor and provided the counsellor with more information about his life. The peak of RA is approximately between the tokens 890 and 910 and reached a score of 0.18.

Similar patterns were also identified in cases one, four, six, seven, eight and nine. All clients of these cases also scored highest on RA during the first part of the program. Clients four and seven reached the highest RA score in the first email they sent to the counsellor and clients one, six, eight and nine during a different email they sent to the counsellor in the first part of the program. A graphical overview of their RA scores can be found in Appendix A.

Besides that, oscillation of RA was found in the RA overview in the emails sent by all clients throughout the program. Oscillation of RA was identified when the RA scores of a client increase or decrease rapidly and the scores vary between positive and negative RA scores. In figure two, two moments of oscillation in RA can be identified. The graph of client three has been chosen as an example, as the varying RA scores are clearly visible and therefore, represents exemplarily the occurrence of oscillation. The first takes place at approximately 600 tokens. There it reached a score of 0.13. Afterward, it rapidly decreased to a score of -0.10 and increased again to a score of 0.14. The second oscillation of RA can be identified in the second part of the program. After approximately token 2250, the RA increased to a score of 0.08. Afterwards, RA decreased to -0.04 and increased to 0.15.

The graphical representations of the other eight clients also show between one and two moments of oscillation. However, these are not as clearly detectable in all cases, as the moments of oscillation from client three. An overview of the oscillation in the other eight cases can also be found in Appendix A.

Concludingly, based on the analyses conducted different patterns of RA throughout the different parts of the program were identified. Seven out of nine clients scored highest on RA during the first part of the program. In five out of nine clients, oscillation of RA was identified. This means that patterns of RA were identified in relation to the different parts of the program.

RA in cases who completed and stopped the program. The second research question was concerned with the differences in referential activity between those clients who completed the program and those clients who stopped prematurely. As already mentioned above, all clients demonstrated a positive level of RA throughout the program. In order to investigate the second research question, cases were clustered based on the moment a client stopped with a program. The clients from cases three and six completed the program, but the contact stopped due to inactivity. All other cases stopped earlier with the program also because of inactivity in their accounts. Table 3 provides an overview of the highest scores of RA in the emails of the clients. Table 3.

Case	Highest RA score	Part of Program	Program completed
	client		
1	0.14	Acting differently	-
2	0.15	Acting differently	-
3	0.18	Follow up	Х
4	0.13	Breaking habits	-
5	0.09	Thinking differently	-
6	0.29	Follow up	Х
7	0.21	Acting differently	-
8	0.31	Setting targets	-
9	0.23	Action plan	-

Highest RA	scores for	client and	the part	of program	they stopped
.0			· · · · ·	J F - 0	

Note. Terms included in 'Part of Program' refer to headings of the emails sent by the client

According to Table 3, the client from case eight has the highest RA score of 0.31. The second highest RA score of 0.29 was measured in an email from the client in the sixth case. The client from the ninth case has the third highest RA score of 0.23 and the client from the third case has the fourth highest RA score with 0.18. Every other client scored below 0.18. The lowest score has been reached by client 4 with 0.13.

To sum up, differences in RA between clients who completed the program and clients who stopped with the program prematurely were identified. Client three and six, who completed the program, scored within the top four of the highest measured RA scores. Most clients who did not completed the program and stopped prematurely scored in the lower half of the RA scores that were measured. This means, that clients can be clustered based on their highest RA scores that was measured and the moment they stopped with the program.

Synchronicity of RA in client and counsellor. The third research questions targeted the possibility of identification of synchronicity of the referential activity from client and counsellor. Synchronicity is being identified when the average RA score of the client follows the average RA score of the counsellor throughout the progress of the program. Synchronicity of the average RA score can be observed in all nine cases. However, six out of nine cases

synchronized at the same moment of the process. Case one is used as an example, as the case exemplarily and clearly demonstrates synchronicity of the average RA scores of client and counsellor, as can be seen in Figure 3, as compared to the other cases.



Figure 3. Average RA scores of client and counsellor from case one.

The x-axis in Figure 3 displays the total number of emails that have been sent by counsellor and client, and the y-axis displays the RA scores, ranging from -0.15 to 0.05. In total, 28 emails have been sent in case one. A synchronic increase of RA can be observed in the beginning of the program. Namely, between the second and fifth email that were sent in case one. The content of the first emails includes the welcoming to the program, introduction of the counsellor and an extensive response of the counsellor on the intake questionnaire of the client. There he paraphrases some answers of the client and asks new questions to the client. The graph of the client increases after the first emails have been sent by the counsellor. In the email that was sent by the client, she responds to the questions that the counsellor asked her. That means, the email includes a detailed description about the client. No synchronicity was identified in the second part of the program and the trend of the average RA scores of client and counsellor is decreasing.

Similar patterns of synchronicity of RA can be observed in the cases two, three, four, five and seven. In these cases, synchronicity of RA is also present during the first ten emails

that were sent by the cases and not present in most cases towards the end of the program. Besides that, moments of synchronicity were not as clearly detectable as in case one. Also, the same explanation applies as for case one. A graphical overview of the synchronicity in RA can be found in Appendix B.

Different patterns of synchronicity in the RA of counsellor and client can be identified in the cases six, eight, and nine. In the graphical overview of case six, a moment of synchronicity can be identified after email 40, a simultaneous increase of RA can be seen. An overview of the RA from client and counsellor of case six can be seen in Figure 4. The graphical overview of RA of case six is provided as it is the only case that displays these patterns.



Figure 4. Average RA scores of client and counsellor from case six.

The RA of the counsellor in email 40 increases from -0-07 to 0.00 and the RA from the client at email 42 from 0.00. The emails that have been written by the counsellor at that moment are about motivating the client for the improvements that she has made in relation to the drinking log, by introducing a new assignment to the client and a sent reminder to the client. The email sent by the client included the thought that she already sent the assignment to the counsellor and provided the counsellor with an update about her drinking behaviour and reasons that she has not filled out the drinking log anymore.

Client and counsellor in case eight also show different patterns of synchronicity throughout the program. Three short moments of synchronicity can be identified. The first moment can be seen after the email that was sent from the counsellor at email five and 30, and at the email eight and 31 when looking at the client's graph. An overview of the RA from case eight is provided in Figure 5.



Figure 5. Average RA scores of client and counsellor from case eight.

The content of the emails sent between email five and eight are about an explanation of the counsellor how the program works. The email which followed by the client is about his concerns about his drinking behaviour. The content of the email sent by the counsellor at email 30 concerns the information about moving on to the second part of the program and the reminder that he can only start with the next part of the program when he saw is general practitioner. The client explained in his email to the counsellor that he will see his general practitioner soon and an gave in an update about how he feels. The email that was sent by the client included a short narrative.

The average RA scores of case nine also show different patterns of synchronicity. The pattern which can be seen in case nine are different from the other cases. Three times, the RA score of the counsellor follows the client, not the other way around. Figure 6 provides an overview of the average scores in case nine. The graph was chosen to be presented at the patterns are unique to case nine.



Figure 6. Average RA scores of client and counsellor from case nine.

A rather negative trend of RA can be seen in Figure 6. Only decreasing patterns of synchronicity can be seen. Between email eight and ten and 18 and 20. Besides that, the average RA scores of the counsellor follow the scores of the client, which is different to all other cases.

Concludingly, based on the conducted analyses answers to the third research question, "can synchronicity in the referential activity from client and counsellor be identified", can be provided. Synchronicity in the average RA scores from client and counsellor can be identified in all nine cases. Six out of nine cases showed similar patterns of synchronicity in their RA scores. Three other client showed different patterns but synchronicity was present. Generally. moments of synchronicity were less often detected towards the end of the program and more often towards the beginning of the program. No differences could be identified in participants who completed the program and participants who stopped with the program prematurely. The cases three and six displayed different synchronicity patterns.

Summary

Throughout all email sequences, patterns of RA could be identified. The first research question that was assed was "how does the referential activity of clients occur in the two phases of the program "Look at your drinking?"". Differences of RA in the different parts of the program have been identified. Seven out of nine clients scored highest in RA during the

first part of the program. Two clients scored highest in the second part of the program. Besides that, oscillation of RA could be identified in case one, two, three four and six during the first and second part of the program. In the other cases, oscillation was only identified in the first part of the program.

The second research question that was targeted was "How does the referential activity differ between clients who completed the program and clients who stopped prematurely?". Based on the progress that clients made, it was possible to cluster them accordingly. Two clients completed the program and scored within the top four of the highest referential activity scores that have be reached throughout the program. Clients who did not complete the program scored below. Case eight and nine are exceptions, who also scored within the four highest measure RA scores.

Research question three focussed on the question: "Can synchronicity of the referential activity from client and counsellor be identified?" After comparing the average scores of RA from client and counsellor, patterns were identified. Synchronicity was identified in all nine cases. Six out of nine cases showed similar patterns of synchronicity within the first ten emails that were sent in the therapy discourse. The other three cases demonstrated different patterns of synchronicity of RA at different moments in the program. In general, phases of synchronicity were more often identified during the beginning of the program and less towards the end of the program.

Discussion

The aim of this study was to analyse email sequences from the e-therapy program "Look at your drinking" in order to investigate whether patterns of referential activity (RA) can be identified throughout the program. As the email sequences from the program contained large corpora of texts, a text mining approach has been chosen to analyse the sequences. Data from nine clients were analysed with the DAAP and WRAD. The WRAD provided DAAP with a weighted wordlist and DAAP calculated scores accordingly. This provided the opportunity to provide graphical demonstrations of the RA scores and the investigation of RA patterns.

The first research question was concerned with how the referential activity of clients occur in the two phases of the program "Look at your drinking". The results showed that seven out of nine clients reached the highest RA score in the first part of the program. Besides that, oscillation RA was identified in five out of nine clients in both parts of the program. Oscillation in the other four clients was identified in one part of the program. An explanation for the high RA scores in the first part of the program can be explained by the length of the answers provided by the clients, as they provided the counsellor with a narrative. The findings are in line with research conducted by Bucci & Maskit (2006). According to them, engaging in narrative increases the possibility of high levels of RA, which is an indication of effective communication of nonverbal experiences. In relation to the program "Look at your drinking" it could mean that the first part of the program is especially effective due to the opportunity for the client to engage in narratives. Furthermore, as oscillation appears mostly in both parts of the program, it can be seen as an indication for the process of the program, which is in accordance with Lo Verde et al., (2012). It enables counsellors to track whether oscillation of

The second research question aimed to investigate whether the referential activity differ between clients who completed the program and clients who stopped prematurely. Based on the analysis it was possible to cluster the clients based on their highest RA score and how far they proceeded in the program. Client three and six completed the program and scored within four highest RA scores that were measured. Clients who did not proceed far in the program scored rather low on RA. These results could mean that clients who score high on RA also have a higher possibility to complete the program. This can also be supported by Lo Verde et al. (2012), who stated that high RA scores are an important feature of a positive process and positive treatment outcome. Knowing that, counsellors could track the RA of

their clients throughout email conversation and would provide them with important information about the likelihood of their client to successfully complete the program. This would be especially useful as the drop-out rates in e-therapy programs are high (Postel, De Haan, Ter Huurne, et al., 2010) and therefore, RA scores could potentially be indicators of drop-outs.

Research question three was concerned about whether synchronicity of the referential activity from client and counsellor could be identified. The results show, that all cases show synchronicity in the average RA scores. Six cases showed similar patterns of synchronicity within the first ten emails that were send throughout their therapy discourse. Other three cases showed different patterns of synchronicity in their RA scores. Comparing the appearance of synchronicity of all cases, synchronicity was less often identified towards the end of the program. This means that synchronicity in the RA scores of client and counsellor can have an influence on the process and outcome of therapy. In the sample provided, it appeared mostly that the RA score of the client increased after the RA of the counsellor increased. Consequently, if the counsellor has an influence on the client's RA, it could mean that the counsellor could be seen as an important medium to increase the client's RA and therefore, influence the process and outcome of therapy consciously.

Theoretical and Practical Implications

The conducted study contributes to already existing literature about the psycholinguistic variable RA in at least three important ways. First of all, conducted research so far on RA was only conducted on face-to-face transcripts of psychotherapy sessions (Maskit & Bucci, 2007; McCarthy et al., 2017; Mergenthaler, 1996) but not on data from online therapy programs. Considering the increase of offers of e-therapy programs research is needed to asses which measure can be used to assess what makes an e-therapy program effective. By conducting this study, a combination is provided. A text mining approach was applied to email sequences of the e-therapy program "Look at your drinking" and the data has

been analysed for patterns of RA. Second, the research conducted contributes to the existing literature about e-therapy programs. Most research conducted so far accesses the effectiveness of program. However, research about what makes an e-therapy program is scarce. Third, a unique contribution of this study to already existing literature is that it was possible to measure and demonstrate the appearance of non-verbal experiences in the verbal expression of clients by means of different graphical representations. The use of graphical data in research on RA is rather scarce. Most researcher provided statistical analyses to account for the appearance of the referential process and RA, whereas the minority of researchers made use of graphical data and statistical analyses (Maskit et al., 2015). None of the research conducted so far only made use of graphical representations of the data.

The implication this study yields for practitioners is also important. By being able to provide practitioners with a method to predict the effectiveness of their e-therapy program, the number of successful completions of e-therapy program can be supported and scores of RA can be used as indications for the possibility to detect people who will drop out of the program based on their level of RA. As already stated by Hoogendoorn et al. (2017), e-therapy programs already provide counsellor with the opportunity to monitor and reflect on the progress which is made. By incorporating the measure of RA, it would provide the counsellor with even deeper insights into the progress which is made.

Limitations

Throughout the study, limitations could be identified. First, only a small sample has been analysed in this study. This is due to the fact that the sample was provided by the psychiatric facility Tactus and only nine clients participated in the English version of the program. Having this small of a sample can be an explanation for the obtained results. By analysing a larger set of data, the probability of clients who complete the program would increase and therefore, could provide more reliable information about what makes the program effective.

Second, the standardization of emails that were sent by the counsellor could have had an influence on the outcome of the study. Only in the first part of the program, clients were asked to provide detailed information about their lives. This means, that it does not leave the client much room to explore, issues, worries, and feelings. Especially, in the second part of the program many emails were sent by the counsellor that included a large amount of content but which did not request an elaborated answer of the client (e.g. "Food for thought"). The program tried to account for this limitation by the use of the drinking log and some assignments. There, the client was asked to also report feelings, issues and worries. However, it could still be explanation for the lower scores of RA in the second part of the program.

Third, in two cases it was difficult to measure the actual RA scores because the clients did not respond by writing on own email but by copying the emails sent by the counsellor and inserting in capital letters their answer after the proposed question. It was tried to account for this problem by deleting the counsellor's email from the answer of the client and to analyse the short answers of the client by itself. This made an accurate analysis more difficult and also provided no insights into the actual RA scores and engagement of the clients in the program

Suggestions for Future Research

Suggestions can be made for further research. As already mentioned in the limitations of the study, a larger sample should be used to obtain more reliable results. Besides that, it can also be suggested that future research should again focus on referential activity scores from client and counsellor. For example, by focussing separately on the different parts of the program and the referential activity scores, it could be investigated what makes each part effective. Also, comparing the highest referential activity scores of clients in a larger sample, would be useful to either reject or confirm results that were found in this study.

Besides that, further research should be conducted about synchronicity of RA scores of clients and counsellor. As synchronicity was present in all cases, it seems to be a useful variable which could provide insights into what makes the program effective. Besides that, it

would be useful to compare the referential activity scores from client and counsellor not merely by comparing the average scores, but also by conducting further statistical analyses. As can be seen in the results, the question arises whether counsellors have an influence on the referential activity of clients. If counsellors have an influence on the referential activity of clients and if they could influence the level of referential activity that clients show, higher scores could be obtained, and positive therapy outcomes achieved. Therefore, more research also needs to focus on the referential activity patterns from the counsellor and not mainly on the client.

Lastly, the suggestion can be made to analyse email sequences from therapy not only by analysing the referential activity but by focusing on the whole referential process. This means conducting analysis with focus on the three phases 'arousal', 'symbolizing', and 'reorganizing'. This should be done as referential activity itself being referred to as the 'symbolizing' phase of referential process (Bucci et al., 2016), or only as a general measurement of the referential process (Maskit & Bucci, 2007). Based on that, additional measures should be used, as for example, Reflection (REF) or Affect (AFFS) dictionaries (Bucci et al., 2016).

Conclusion

The study aimed to provide new insights in the field of research in which it was conducted. Limited studies exist about what makes online therapy program effective. Also, research on RA has mostly focused on transcripts of face-to-face therapies and studies that combine e-therapy programs and RA are scarce. However, this study showed that RA can be meaningfully detected in digital data and provides new insights into how RA can be used to assess process and outcome of an e-therapy program.

New insights have been gained about the appliance of RA in the e-therapy setting, especially with focus on the program "Look at your drinking". The first research question, focused on whether different patterns can be identified in the different parts of the program.

This information can be used to detect which part is most effective and what makes it effective. It showed that the first part of the program seemed to be effective as many clients engaged in narratives about their life, which caused an increase in the level of RA in their language. This information can be used to track the process of the therapy. Besides that, it shows that oscillation of high and low scores of RA was present, which functions as an indication of effectiveness and positive process of the therapy program itself.

The second research question was concerned with the client's RA score in relation to dropping out of the program. The clients who completed the program "Look at your drinking" scored within the highest obtained scores. Clients who stopped prematurely showed lower RA scores. By providing future counsellors in e-therapy programs with the measure of RA, chances of clients dropping out of the program can be identified.

The last research question, which concerns the synchronicity of client and counsellor RA scores, can provide the counsellor with an important tool and a method of insight for the engagement of the client. Synchronicity was identified in all nine cases, mostly in the first part of the program. In case counsellors can influence the level of RA of a client, this can be actively used by the counsellor to increase the chances of successful treatment. If the counsellor engages in higher level of RA, clients RA level could also increase.

All three findings of the study hold promising results for the assessment of process and outcome of an e-therapy program. Especially, the detection of synchronicity in the RA from counsellor and client can be valuable for counsellors in the e-therapy setting. If further research supports current findings and find out whether counsellors can influence the level of RA from the client with their own level of RA, it could be used as a tool in order to increase the chance of clients who successfully complete the program. The other two findings, about patterns of RA in the timing of the program and peak scores of clients, could provide counsellor with a general information in order to evaluate the process and effectiveness of the program until that moment, or afterwards as a method of reflection.

Therefore, further research about RA in the online therapeutic context is desired in order to support current findings of this study and to gain a better understanding of how RA can be used as a tool for the counsellors in order to evaluate the process and outcome of the program.

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Appendices

Appendix A. Graphical representation of RA from client of case one, two, four, five, six,





Figure 1. Graphical representation of RA from client of case one.



Figure 2. Graphical representation of RA from client of case two.



Figure 3. Graphical representation of RA from client of case four.



Figure 4. Graphical representation of RA from client of case five.



Figure 5. Graphical representation of RA from client of case six.



Figure 6. Graphical representation of RA from client of case seven.



Figure 7. Graphical representation of RA from client of case eight.



Figure 8. Graphical representation of RA from client of case nine.

Appendix B. Average RA scores of client and counsellor from case two, three, four, five,

and seven



Figure 1. Average RA scores case two.



Figure 2. Average RA scores case three.



Figure 3. Average RA scores case four.



Figure 4. Average RA scores case five.



Figure 5. Average RA scores case seven.