Tackling Depression by Finding Purpose in Life

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“A thesis is an aptitude test for students. The approval of the thesis is proof that the student has sufficient research and reporting skills to graduate, but does not guarantee the quality of the research and the results of the research as such, and the thesis is therefore not necessarily suitable to be used as an academic source to refer to. If you would like to know more about the research discussed in this thesis and any publications based on it, to which you could refer, please contact the supervisor mentioned.”

Abstract

As purpose, a subcomponent of meaning in life, is connected to depression, we wanted to investigate the effect of a short, online purpose intervention on depression. Following this, we investigated when comparing different time points one week apart, after receiving a purpose intervention, students will have reduced depression scores compared to students who did not receive an intervention. Psychology university students were randomly assigned to either a purpose intervention condition or a no-intervention control condition. For our main analysis, we conducted a repeated measures ANOVA (N = 74), where we investigated depression scores over two time points for the two conditions (purpose: N = 16; control: N = 58). As the intervention did not work in all persons, the main analysis was only executed on persons who benefitted from the intervention. Results from the analysis imply that the purpose intervention was effective in further decreasing depression scores (F = 10.83; p = .002) among students with a medium to large effect size (ηp^2 = .131) in comparison to the control condition (MD = -4.39; d = -.39). This study has strengthened the connection between purpose and depression as well as shown, that purpose has the potential to be used as a short-term intervention to improve depression. It also highlights the importance of using intervention research in non-clinical, young adult populations with experimental designs.

Keywords: meaningfulness, purpose, intervention, depression, university students

Tackling Depression by Finding Purpose in Life

Humans are said to be meaning-makers: “From birth onwards, we try to make sense of the world. We innately and automatically seek out, construct, and apply mental representations of expected relations...” (Heine, Proulx & Vohs, 2006, p.91), to any information we can grasp onto, trying to create meaning wherever we can. We may do this because “meaning-making” is an evolutionarily adaptive trait (Heine, Proulx & Vohs, 2006) or a core mental attribute shared by humans everywhere (Norenzayan & Heine, 2005). Nonetheless, the need to make meaning seems to be fundamental to humans (Tomasello, 1999).

Despite its apparent inherence to the human experience, meaning has been noted to be a vague and mysterious concept for ages (King & Hicks, 2021), especially in theology and philosophy (Yalom, 1980), as they tried to decipher what meaning might be. However, to understand what meaning is from a confined field such as psychology, one needs to move away from the domain of mystery (King & Hicks, 2021).

Meaningfulness in Psychology

This first big step was done in the year 1946 by Viktor Frankl, an Austrian psychiatrist. He recognized that “What matters, …, is not the meaning of life in general but rather the specific meaning of a person's life at a given moment” (Frankl, 1992, p.113). With that, Frankl delivered the first broad framework for meaningfulness, moving from the meaning of life to the meaning in life.

Definitions of Meaningfulness

Throughout the years, many new conceptualizations of meaningfulness arose. It has been theorized, that meaning in one’s life was a sense of coherence, order, purpose, and fulfillment

(Reker & Wong, 1988), or an understanding of connections for people or objects. Baumeister (1991) defined meaning as the significance of one's life, as a connection between things, and as "a tool for imposing stability" (Baumeister & Vohs, 2002, p.609). Reker (2000) posed meaning to be the pursuit and attainment of worthwhile goals, and Markman, Proulx, and Lindberg (2013, p.4) put meaning as sense-making, a theme of how: "People come to understand themselves, their environments, and their relationship to their environment." It was also defined by the beliefs one holds about the world, about oneself, and the relation thereof (Park, 2010). Lastly, meaning was theorized to be a subjective judgment process and a lived experience (Hicks & King, 2009).

Despite the definitions describing distinct aspects such as different types of connections, relationships, or judgments they were beginning to align through common themes. One of those themes of meaning was sense-making by creating connections or relationships between things (Baumeister, 1991; Baumeister & Vohs, 2002; Markman, Proulx & Lindberg, 2013; Park, 2010; Reker & Wong 1988), another was the creation of purpose or personally relevant goals (Baumeister 1991; Reker, 2000; Reker & Wong 1988), and a third was a sense of significance to one's life (Baumeister 1991; King et al. 2006).

Towards One Concept of Meaningfulness. Recently, several scholars have been agreeing on a three-faceted model of meaning in life (Heintzelmann & King 2014) with Martela and Steger (2016) as well as George and Park (2016) providing the biggest theoretical overview of the so-called tripartite model. This now mostly agreed-upon model unifies different definitions and confines meaningfulness into three dimensions: comprehension, mattering, and purpose (Costin & Vignoles, 2020; George & Park, 2016; King et al., 2006; Martela & Steger, 2016; Shin & Steger, 2014).

The first dimension, comprehension, has been conceptualized as the perception of an understanding and coherence of one's life and the world. Both make sense, are understandable, and have an order (Martela & Steger, 2016). With high comprehension, "things seem clear, fit together well, and are as they ought to be" (George & Park, 2016, p.206).

The second dimension, mattering, refers to the degree to which one feels that their existence is of "significance, importance, and value in the world" (George & Park, 2016, p.206). A life that matters is worthwhile and has a sense of profoundness and inherent value (Martela & Steger, 2016).

Purpose in Life. The last dimension, purpose, is defined as "a central, self-organizing life aim that organizes and stimulates goals, manages behaviors, and provides a sense of meaning" (McKnight & Kashdan, 2009, p.242). People with purpose are highly committed to it and have a clear sense of direction (George & Park, 2016, Martela & Steger, 2016). Purpose will be the focus of this study.

It is important to distinguish that whilst goals are essential for purpose, purpose itself is an "ideal future state" that is not obtainable in a concrete sense as goals are (Shin & Steger, 2014). It is a broader motivational component, and its desired outcome doesn't have to essentially be obtained, it simply needs to motivate the person to be oriented towards it, which can be done through the achievement of purposeful goals (McKnight & Kashdan, 2009).

For goals to be purposeful, they must be self-concordant; the degree to which goals are well-integrated with the self, expressing one's enduring interests and values (Shin & Steger, 2014). Shin and Steger (2014) also note, that if one commits to such personal goals, they lend a sense of

life structure and agency as well as personal meaning to one's life. This reflects Frankl's idea that meaning is something exclusive to every individual (Frankl, 1992).

Finally, it is helpful to regard purpose as the "highest order goal", stimulating multiple higher-order goals that are logically consistent with the purpose goal, which in turn stimulate various lower-order goals (McKnight & Kashdan, 2009). To provide an example the highest purpose goal can also be regarded as a "be goal" (George & Park, 2016): One has the goal to "be a good professor" which is not directly attainable. By working on related higher-order goals like "providing good education" or "good time management" one can work towards their purpose goal with even smaller-order concrete goals like "have the lectures prepared on time" or "provide practical examples."

Meaningful Interventions

With the integration of definitions into a summary conceptualization (Martla & Steger, 2016; George & Park, 2016), it is interesting to look at how one can use meaning to promote health. Meaning has been related to lower levels of distress and may serve as a buffer against it (Park & Baumeister, 2017), is inversely related to repetitive negative thinking (Ostafin & Proulx, 2020), it can predict healthy eating and physical activity (Brassai, Piko & Steger, 2015), well-being (Steger, Oishi & Kashdan, 2009) and even happiness (Steger et al., 2006). While these findings imply how useful meaningfulness could be, they are only observational and if we want to promote health, we need to move towards practical implementation.

Previous Interventions

Some researchers have taken this next step by trying to establish different novel meaning interventions (for an overview, see LeMay & Wilson, 2008). Breitbart, Poppito, and colleagues

created the Individual Meaning Centered Psychotherapy (IMCP), a psychoeducational counseling intervention based on principles from Logotherapy to help patients with cancer discover and increase their meaning in life (Breitbart et al., 2012). Lee and colleagues (2006; Henry et al., 2010) made the Meaning Making intervention (MMi) a therapist-led approach, promoting self-exploration based on life schemas as a treatment for cancer. Wong created the Meaningful life group project with Meaning Center Counseling (MCC) based on Logotherapy and positive psychology, providing workshops and lectures to help people find meaning in life (Wong, 2015).

Even though these interventions advanced practical research on meaning, only limited findings exist for their actual effectiveness using experimental designs (for exceptions see Breitbart et al., 2012, 2018). As reports about interventions tend to be descriptive instead of evaluative (Shin & Steger, 2014), there is a gap in interventions that produce evidence using causality-based methods. To fully use the potential of meaning we need to move beyond the observational, as interventions are "trailing behind" (van Agteren et al., 2021, p.3574), and the use of causality-establishing methods is the logical next step.

Moreover, most of these interventions were designed to help adults under adverse life circumstances within clinical samples (Breitbart et al., 2018; Lee et al., 2006; Wong, 2015) and it is unclear if they are useful for the general population (Shin & Steger, 2014). For interventions to be useful, they need to be based upon sufficient empirical evidence and it is important to implement them in new populations (Aarons et al., 2017).

In addition, most interventions are based on logotherapy which was not designed for specific therapeutic tools or techniques (Shin & Steger, 2014) and it is not certain if they do impact meaning as they aim to generally impact mental health. If they do, they still usually target the researcher's own definitions of meaning and do not use a clear conceptual framework (Shin &

Steger, 2014) such as the tripartite model. As Martela and Steger (2016, p. 541) put it "the field needs to move beyond looking at meaning in life as an omnibus construct and instead to begin researching separately the three general facets that have been associated with it".

Despite the progress, these interventions have brought to the practical field of meaning, further advancements are needed for meaning interventions to be established as a treatment. These can be achieved by using non-clinical populations, evidence-based methods (Shin & Steger, 2014), and sticking to a more uniform definition of the concept (Martela & Steger, 2016).

Purpose as a Depression Intervention

Using the tripartite model, the purpose dimension is promising to use as an intervention due to its relation to health outcomes. In a large cohort study with a sample of 7,168 adults, participants with high purpose were more likely to use preventive health care services and spent fewer nights in the hospital (Kim, Strecher & Ryff, 2014) and an fMRI study with an adult sample found people with purpose to be less likely to experience conflict-related regulatory burdens and more likely to accept conflicting yet beneficial health messages (Kang et al., 2019). In addition to those benefits, purpose has also been identified to have a connection to depression in various studies (Hedberg et al. 2010; Kim, Hayward & Reed, 2014; Lyon & Younger, 2001; Pinquart, 2002).

Depression is a major public health issue and one of the most prevalent mental health diseases (Liu et al., 2020). People suffering from depression experience a set of specific negative behavioral, cognitive, social, and biological symptoms generating difficulties in their daily functioning as well as suffering (Bernard, 2018). As depression often is unrecognized and untreated due to its stigma and the difficulty in access to treatment (Pincus et al., 2001), finding a

way to deal with those issues and mitigate the symptoms is of major importance, which may be done with new, innovative, and low-cost treatments (Hollon et al., 2002). One such treatment may potentially be a purpose intervention as depression and purpose appear to be closely linked (Hedberg et al. 2010; Kim, Hayward & Reed, 2014; Lyon & Younger, 2001; Pinquart, 2002).

Theoretical Connection Between Purpose and Depression

This connection between purpose and depression may be explained because finding purpose is associated with positive feelings or pleasure (Ebersole, 1998; Wong, 1998), which have been shown to be effective tools against depression in a pleasure-based, placebo-controlled online intervention with adults (Gander, Proyer & Ruch, 2018) and a systematic review examining positive emotions (Santos et al., 2013). One can also assume, that people who strive for personal meaningful goals experience higher optimism or motivation (Lapierre et al., 2001) which makes them less likely to develop depressive symptoms (Giltay, Zitman & Kromhout, 2006) and helps them to recover more quickly from depression (Kronström et al., 2011). On the other hand, the loss of purpose may result in an "existential vacuum", feelings of meaninglessness, and depression (Frankl, 1992). Another possible explanation is that purpose in life may predict better emotional recovery from negative stimuli and promote resilience, as in a large adult sample, purpose in life was associated with better emotional recovery following exposure to negative picture stimuli indexed by the magnitude of the eyeblink startle reflex (Schaefer et al., 2013). The authors suggest that "purpose in life may motivate to constructively learn from and adaptively reappraise negative events and avoid brooding and negative tendencies" (p.7). In addition, one's enhanced ability to recover may in turn also allow achievement or maintenance of a greater purpose in life feeling.

Goal Interventions and Purpose

When looking at purpose as an intervention, one should also pay attention to goals as they are integral to finding purpose. Setting them can help one strive towards one's purpose (McKnight & Kashdan, 2009) and has had positive implications as an intervention for mental health and depression in prior studies. In a cross-over design study, those who received a goal setting and planning intervention decreased in negative affect and showed trends towards significant decreases in depression compared with wait-list controls (Coote & MacLeod, 2012):

From an observational perspective, when looking at self-concordant goals or strivings, another cross-sectional study found them to be associated with and beneficial for our well-being and happiness in an adult and elderly sample (Sheldon & Kasser, 2001). In two studies with university students, McGregor and Little (1998) found that goal efficacy was associated with happiness and goal integrity was associated with meaning. In addition, a longitudinal study over 18 years with 3,294 adult Americans aging from 20 to 74, discovered that people who have a positive outlook and persist on their goals appear to have less depression. The ones with high prior levels of goal persistence also showed lower levels of depression (Zainal & Newman, 2019).

Purpose and Depression Evidence

When specifically examining the purpose dimension and depression, in a cross-sectional study with elders, participants in the depressed group scored lower than the not depressed on a Purpose in Life Test (Hedberg et al., 2010). In a longitudinal study with cross-sectional data, people with a strong purpose in life appeared to have a buffering effect of traumas on depression, as a decline in depressed affect scores was found for older adults with high observed purpose in

life scores (Krause, 2007). In a correlational study with HIV patients, low purpose in life was an even stronger predictor of depressive symptoms than was HIV disease severity (Lyon & Younger, 2001) and when looking at a cross-sectional design with Korean elders, their purpose in life was found to be strongly related to lower depressive symptoms (Kim, Hayward & Reed, 2014). When instructing their participants to monitor their effort and progress towards their purpose in life, Kashdan and McKnight (2013) found that purpose can help promote well-being and self-esteem as well as decrease negative symptoms in healthy controls from an adult community sample compared to those with social anxiety disorder. Finally, a meta-analysis from Pinquart (2002) found a strong positive relationship between purpose in life and well-being as well as a strong inverse correlation between purpose and depression. Therefore, if one has a purpose in life, one may also experience lower levels of depression.

Purpose and Populations

However, until now, studies on purpose mostly focus on older populations (Kim, Hayward & Reed, 2014; Hedberg et al. 2010). The only meta-analysis looking at purpose and age differences found that the ones who are 69 or younger reported more purpose than those who are 70 and older with a small effect size (Pinquart, 2002) and within a limited age range. As correlational data from a large sample of internet users suggests, people in earlier stages of life may even be experiencing less presence of meaning than ones in later stages (Steger, Oishi & Kashdan, 2009), and less purpose as a Canadian sample of church representatives from different age groups implies (Meier & Edwards, 1974). This may potentially be because they have an ineffective way to search for meaning (Steger et al., 2008a). In addition, undergraduates with low purpose in life scores have been shown to have elevated depression scores (Phillips, 1980; Lester & Badro, 1992), which makes it intriguing to look at university students as a younger population of

interest. “Students are in a period of emerging adulthood characterized by relative instability and struggling; whilst trying to understand who they are and what they are going to do with their lives” (Masten, Obradović & Burt, 2006, pp. 173–190). Moreover, they more often experience higher rates of depression than the general population (Ibrahim et al., 2013; Snyder, de Brey & Dillow, 2016). As students can be in a period of uncertainty and self-discovery, an intervention may be especially beneficial for this age group. Research findings from Bundick (2011) support this argument. In a pretest-posttest experimental design with college students, they engaged in a guided discussion about values, life goals, and purpose, finding students to benefit from the intervention with increased goal-directedness and life satisfaction. The authors advise that administering purpose interventions in young adults can be very effective and beneficial if done early on. As such, this study intends to do so by administering a novel purpose intervention to influence the levels of depression in university students.

Research Question

Does a purpose intervention decrease depression severity in university students?

Hypothesis

After receiving a purpose intervention, students will have reduced depression scores compared to those who did not receive an intervention.

Methods

Participants

This study consisted of 112 participants, all of whom were first-year psychology students from the University of Groningen in the Netherlands. The study was conducted in English, and most of the participants were moderately fluent (19.3%, $N = 21$), almost completely fluent in

English (51.4%, *N* = 56), or completely fluent (20.2%, *N* = 22) as they were recruited from the international psychology program of the university.

Non-completers, participants who received the comprehension intervention, and those who did not participate in the follow-up were excluded from the analysis. From the sample used for the manipulation check (*N* = 112), 31 were male (27.7%) 80 female (71.4%), and 1 non-binary (0.9%), aged between 17-30, most of them being between 18 and 22 (90%*)*. Most of the sample's participants were either Dutch (66.1%, *N* = 74) or German (23.2%, *N* = 26), the rest were from other nationalities (10.7%, *N* = 12).

For the main analysis and post-hoc test sample (*N* = 74) participants were somewhat fluent (6.8%, *N* = 5), moderately fluent (20.3%, *N* = 15), almost completely fluent in English (51.4%, *N* = 38), or completely fluent (21.6%, *N* = 16). 21 were male (28.4%) 53 female (71.6%), aged between 17-26, most of them being between 18-and 22 (90.7%*)*. Most of the sample's participants were either Dutch (66.2%, *N* = 49) or German (21.6%, *N* = 16), and the rest were from other nationalities (12.2%, *N* = 9).

Materials

Depression Severity

Depression severity was assessed using the Major depression inventory (MDI; Bech et al., 2001; Bech et al., 2015; Cuijpers et al., 2007; Olsen et al., 2003) for pre-intervention and post-intervention at follow-up. The MDI is an official questionnaire of the World Health Organization and measures the level of depression of the past 2 weeks with 12 items like "Have you felt low in spirits or sad"? or "Have you lost interest in your daily activities?". The questionnaire uses a 6-point Likert scale which ranges from 0-to 5, with 0 indicating "At no time" and 5 indicating "All

the time". A total score of 20-to 24 indicates mild depression, a score of 25-to 29 moderate depression, and a score of 30 or more indicates severe depression (Bech et al., 2001). Total sum scores can range from 0 to 60.

The MDI has demonstrated high reliability and validity in a patient sample (α = .82; Olsen et al., 2003) as well as in this student sample (α = .91). In addition, it has demonstrated good specificity and sensitivity in other patient samples (Bech et al., 2001; Bech et al., 2015).

Purpose

To assess purpose, the purpose subscale of the Multidimensional Existential Meaning Scale (MEMS) was used, which measures the purpose dimension of the tripartite model (George & Park, 2016). The MEMS purpose subscale consists of 5 items on a 7-point Likert scale ranging from 0 "Very strongly disagree" to 6 "Very strongly agree". Items contained answers like "I have aims in my life that are worth striving for" or "I have overarching goals that guide me in my life". Subscale sum scores can range from 0 to 30.

The MEMS purpose subscale has a theoretically meaningful factor structure, high internal consistency (α =.89), good test-retest reliability, good overlap with existing meaning in life measures, and consistent convergent and divergent relationships with theoretically relevant variables in a sample of undergraduate students (George & Park, 2017). In the current student sample, good internal consistency has also been demonstrated for the purpose subscale (α = .88).

Other Scales

Additional scales for mental health were also used, which are unrelated to this research question.

Intervention

A purpose intervention specifically designed for this study was administered online after the first questionnaires. The intervention took around 30 minutes and covered what participants wanted to do with their life, their aims for the future, core values, important life goals, and related long-term and short-term goals. Specifics about the intervention can be found in the appendix.

Procedures

This study has already been conducted last year and had an experimental design. First-year psychology students were recruited through SONA, an online recruitment system designed for research sign-up to take part in this online study. The questionnaires and interventions for this paper were assessed online, using Qualtrics software, Version 2021 of Qualtrics (Qualtrics, 2021). As compensation, participants received SONA credits, which they required to complete a part of their course. After receiving an information sheet about the study and being asked for consent, participants gave their email addresses and SONA number. They were also informed that the research is about short-term well-being. They then filled out a battery of questionnaires (including depression and meaningfulness) and were assigned to one of the conditions (purpose, comprehension, and control). Participants were randomly allocated to each condition, and they did not know that there were different groups. The participants from the intervention condition received an intervention according to their group for either comprehension or purpose, with additional homework which they could complete at home. However, the comprehension intervention is irrelevant to this thesis and will not be considered. Participants in the control condition only filled out the questionnaires and did not receive an intervention. After the interventions, the participants filled out demographics about their age, gender, nationality, and fluency in English. Finally, after one week, participants received an email for the follow-up part,

where they filled out the initial questionnaire battery including the MDI about the past week's depression and the meaningfulness questionnaire MEMS again. The participants did not have to come to the lab but could fill out the intervention and questionnaires in a context and at a time of their choice.

Method of Analysis

Before the main analysis was started, a manipulation check was performed to investigate if the intervention does increase purpose. For a t-test, the assumptions are independence of observations, normality, and homogeneity of variance (Agresti & Finlay, 2009). We first tested the assumptions of normality by inspecting histograms and measures of skew and kurtosis and afterward conducted a Levene's test to investigate the homogeneity of variances. After we had checked the descriptives, an independent t-test was conducted to check if the two groups differ on pre-MEMS and post-MEMS scores.

The main analysis was a repeated measures mixed ANOVA, as this can account for time, group, and interaction effects (Tabachnick & Fidell, 2013). In addition, repeated measure designs help to keep the variability low, and allow smaller groups of participants while still maintaining high validity and power (Lamb, 2003). The between-subject variables were the purpose group (intervention) and the control group (no intervention), and the within-subject variables were pre- and post-depression scores. The assumptions of a repeated measures ANOVA are independence of observations, normality, and sphericity (Tabachnick & Fidell, 2013). A Durbin-Watson test was conducted to test for the independence of observations. A Shapiro-Wilk test, as well as an inspection of residual plots and measures of skew and kurtosis, were used to check for normality. Even though sphericity is usual for a repeated measures analysis, with only two time points, it

was redundant and did not need to be considered. Afterward, descriptives of the depression measures for both groups and demographics were investigated.

For the post-hoc analysis, another independent t-test was conducted to check if groups differ on post-depression scores. For a t-test, the assumptions are independence of observations, normality, and homogeneity of variance (Agresti & Finlay, 2009). As the first two were already covered in the previous assumption checks only a Levene's test was conducted to check for the homogeneity of variance for post-depression.

As the data have been already collected last year, instead of a sample size estimation, a sensitivity analysis was conducted. The sensitivity analysis was conducted using G*Power version 3.1.9.7 (Faul, Erdfelder & Buchner, 2009). A repeated measures within- and between subjects ANOVA with 74 participants across two conditions would be sensitive to effects of $f = 0.165$ with 80% power ($p = 0.05$). This means the study would have not been able to reliably detect effects smaller than $f = 0.165$ (small effect size, Salkind, 2010a) and below a critical $F = 3.97$.

Pre- and post-MEMS for the purpose scale, as well as pre-and post-depression, were each combined into a total score. In addition, z-scores and boxplots were used to check for outliers.

Results

Data Preparation and Analysis

Of the 272 initial respondents, 39 were excluded for noncompletion, 64 for not participating in the follow-up study, and 57 for being part of the comprehension intervention, resulting in a sample size of 112 participants, with 58 for the control group and 54 for the purpose group, which was used for the manipulation check.

One participant was excluded from the age frequency analysis (N = 111) for an invalid answer to the questions asking for the participants' age, however, the rest of this participant's scores were retained. Upon inspecting the boxplots of the purpose-MEMS, only three participants were outliers for pre-and post-MEMS, but they were retained as z-scores indicated them to be in between 3 *SD* of the mean (Rousseeuw & Hubert, 2011). For depression, neither the boxplots nor the z-scores indicated any outliers. After the calculation of gain scores on MEMS purpose scores for the purpose intervention group, an additional 38 participants of that group were excluded, and the main analysis was continued with 74 respondents (purpose group: N = 16, control group: N = 58).

Assumptions Manipulation Check

As participants were independently assigned to groups the assumption of independence of observations was met (Agresti & Finlay, 2009).

To check for normality of the variables, histograms were inspected (Figures 5 & 6) indicating no deviation from normality for both pre-and post-MEMS. In addition, measures of skew and kurtosis were inspected with both being between -1 and 1, further indicating normality (Agresti & Finlay, 2009).

To test the equality of error variances a Levene's test (Table 7) has been conducted. The test suggests that pre-MEMS (p = 0.099) was insignificant, whereas the post-MEMS test (p = 0.038) was significant. The pre-MEMS does not reject the null hypothesis of equal error variance of the dependent variable and checks the assumption, the post-MEMS rejects the null hypothesis and thus violates the assumption. Nevertheless, a violation of this assumption has been suggested to

be less of an issue with roughly equivalent group sizes (Glass & Stanley, 1970), so the analysis was continued. In addition, t-scores can be interpreted with equal and unequal variances assumed.

Descriptives Manipulation Check

Table 6

Descriptives MEMS Purpose Scale with Conditions

	condition	Mean	Std. Deviation	N
Pre-MEMS	control	20.85	5.35	58
	purpose	21.50	4.08	54
	Total	21.16	4.77	112
Post-MEMS	control	20.62	4.74	58
	purpose	21.00	3.61	54
	Total	20.80	4.22	112

Manipulation Check T-Test

The 54 participants who received the purpose intervention compared to the 58 participants in the control group did not significantly differ in neither pre-MEMS $t(110) = .724$ $p = .470$ with equal variances assumed (as the assumption was met for pre-MEMS), nor post-MEMS scores, $t(110) = .478$, $p = .317$ with equal variances not assumed (as the assumption was not met for post-MEMS; Table 8). This suggests that the purpose intervention did not significantly increase purpose scores on the MEMS post-measure for purpose.

As the intervention did only impact a small part of our sample, we calculated gain scores and excluded participants who did not gain higher MEMS purpose scores from the intervention. By doing this, we could distinguish the individual change in response to the intervention and only

include participants for which the intervention was effective (Salkind, 2010b). As such we were left with 16 participants in the purpose group, who improved in purpose from the intervention, and 58 participants in the control group. This resulted in a sample of $N = 74$.

Descriptives of Purpose Groups

Table 20

Descriptives for Intervention Group Purpose Gain

	Gain on purpose	N	Mean	Std. Deviation
Pre-MEMS	no increase	38	22.71	3.20
	increase	16	18.63	4.60
Post-MEMS	no increase	38	20.47	3.40
	increase	16	21.00	3.91

From the intervention group, the participants who did not increase on purpose showed higher base purpose scores than the ones who did increase on purpose.

Assumptions Main Analysis

Due to the independently assigned groups and a Durbin-Watson test (Table 9) with a value of 1.602 indicating no autocorrelation, the independence of observations was confirmed (Agresti & Finlay, 2009).

The Shapiro-Wilk test (Table 10) was conducted to test the normality of the variables, indicating no normal distribution for both pre- ($p = 0.023$) and post-depression ($p < .001$) however, the Shapiro-Wilk test can be unreliable with samples <50 (Kim, 2013). Due to the high sample size, measures of skew and kurtosis being between -1 and 1 (Table 12), and residual plots

indicating normality (Figures 1 & 2), the analysis was continued. In addition, the repeated measures ANOVA is robust against violations of normality (Cohen, 2008).

Descriptives Main Analysis

Table 11

Descriptive Statistics Depression

	Condition	Mean	Std. Deviation	N
Pre-depression	control	17.97	10.85	58
	purpose	20.50	6.56	16
	Total	18.51	10.10	74
Post-depression	control	16.45	12.33	58
	purpose	12.06	5.53	16
	Total	15.50	11.33	74

Almost every of the mean scores is below the lowest level of depression of the MDI (mild depression = 20, Bech et al., 2001).

Descriptives for MEMS Purpose Scale with New Sample

Table 19

Group Statistics for Purpose Scale MEMS-Scores

	groups	N	Mean	Std. Deviation
Pre-MEMS	control	58	20.85	5.35
	Intervention	16	18.63	4.60
Post-MEMS	Control	58	20.62	4.74
	intervention	16	22.25	4.60

Main Analysis

To recall, we intend to test if after receiving a purpose intervention, students will have reduced depression scores compared to those who did not receive an intervention. Participants listed life goals for improving or fostering relationships, raising a family, finding a partner, improving themselves, and pursuing their future careers.

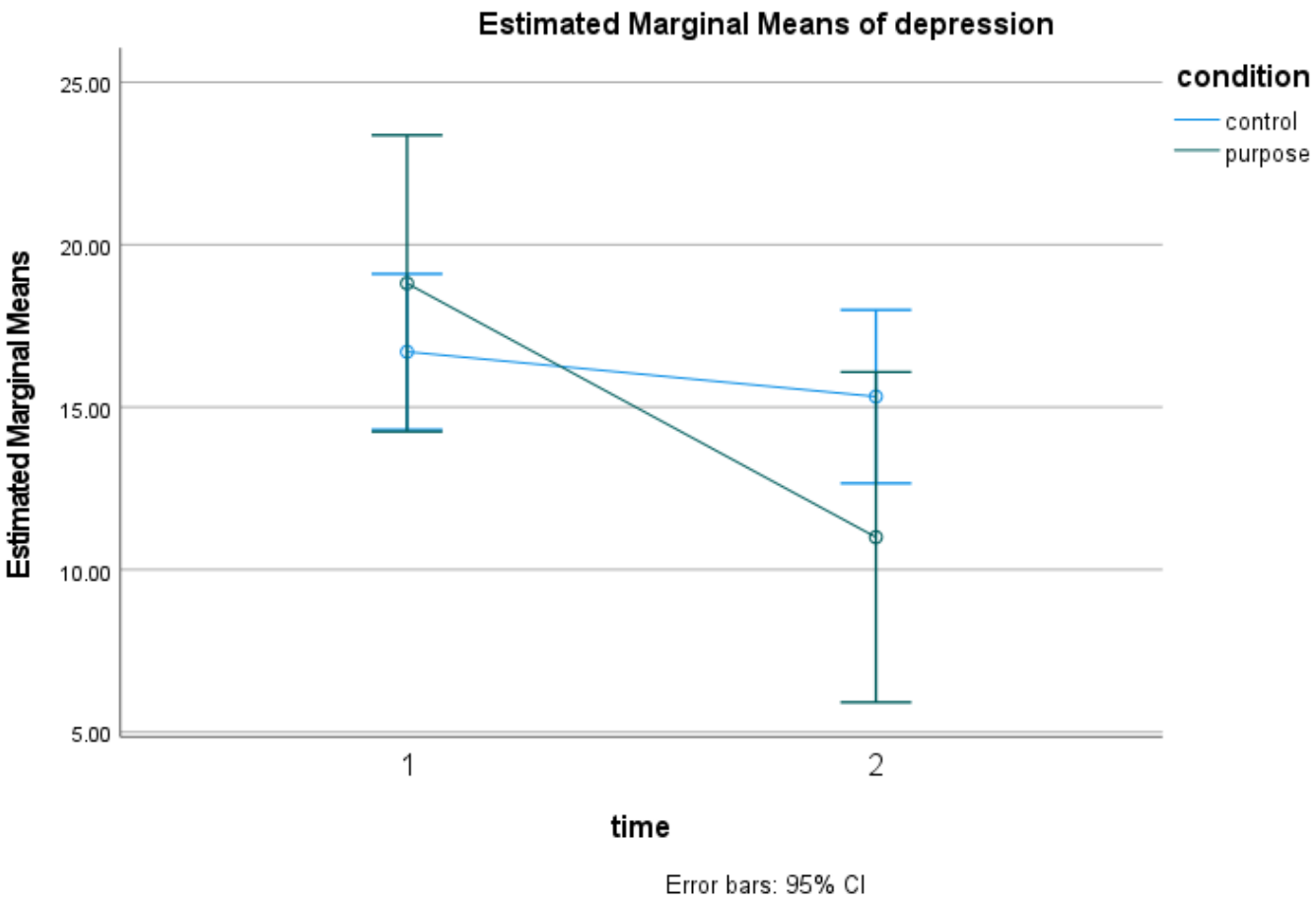
The multivariate test results (Table 14) indicate that the main effect of time is statistically significant, Wilks' lambda=.763, $F(1,72) = 22.41$, $\eta p^2 = .237$, $p < .001$. This effect, however, is qualified by a significant time * condition interaction, Wilks' lambda = .869, $F(1,72) = 10.83$, $\eta p^2 = .131$, $p = .002$. The interaction is indicating that the variation in the means of depression over the repeated measurement occasions itself varies as a function of a group membership.

Upon inspection of the profile plot of means (Figure 4), depression scores decrease over time for both groups, and participants of the purpose intervention group decreased even more than the

control group. This aligns with our hypothesis that people who receive a purpose intervention decrease more in depression scores than controls.

Figure 4

Marginal Means of Conditions (Control and Purpose) Over Time (Pre-and Post-Depression)



Note: Graph depicting means of pre-(1) and post-depression (2), for the groups of control (blue) and purpose (green). For the control group $N = 58$, and for the purpose group where the intervention worked $N = 16$.

For the between-subjects test (Table 15), the main effect of the intervention group on the average depression scores is statistically insignificant $F(1,72) = .11$, $\eta p^2 = .001$, $p = .745$. In our sample, we failed to find a significant difference between the two groups when looking at only the group effect for both time points of depression at once.

As the between-subjects effect was insignificant, we wanted to inspect how much the groups differ when only considering post-depression scores, so a post-hoc independent samples t-test was conducted comparing the two conditions.

Additional Analysis: Assumptions Post-Hoc

For the remaining assumption of the equality of error variances a Levene's test (Table 16) has been conducted. The test suggests that post-depression scores (p <.0.001) are significantly different, rejecting the null hypothesis of equal error variance of the dependent variable and thus violating the assumption. Regardless, the t-test allows an interpretation of results with unequal variances assumed.

Additional Analysis: Post-Hoc Independent Samples T-Test

The 16 participants who received the purpose intervention and for whom the intervention was effective ($M = 12.06$, $SD = 5.53$) scored significantly lower in post-depression scores: $t(56.41) = -2.060$, $p = .044$, $d = -.39$ compared to the 58 participants in the control group ($M = 16.45$, $SD = 12.45$) with a mean difference of $MD = -4.39$ when equal variances are not assumed (as the assumption for post-depression was not met; Table 17). In alignment with our hypothesis, this suggests that participants from the intervention group scored lower on post-depression scores than participants from the control condition.

Discussion

Research Question

Previous meaning intervention research has mostly utilized cross-sectional designs (Shin & Steger, 2014) which in contrast with experimental designs, are unable to produce causality-based evidence. It has also focused on clinical samples under adverse circumstances (Breitbart et al., 2012, 2018; Lee et al., 2006), which makes it unclear if they are useful for the general population or people outside of a clinical setting. They also did not adhere to a clear conceptual framework for meaning with their theoretical foundation being based partly on the outdated logotherapy or general meaningfulness (Shin & Steger, 2014), and research on purpose mostly concerned older populations (Hedberg et al. 2010; Kim, Hayward & Reed, 2014; Pinquart, 2002). With the use of a young adult sample of university students (Bundick, 2011), a clear framework of meaning with the purpose dimension (George & Park, 2016; Martela & Steger, 2016; McKnight & Kashdan, 2009), and an experimental design (Shin & Steger, 2014; van Agteren et al., 2021), we wanted to help fill these gaps of meaning research.

Given the apparent protective function of purpose, its inverse relationship with depression (Hedberg et al. 2010; Kim, Hayward & Reed, 2014; Lyon & Younger, 2001; Pinquart, 2002), and the benefits for adolescents (Bundick, 2011; Lester & Badro, 1992; Phillips, 1980) we expected that administering a purpose intervention would reduce the severity of depression in university students.

Interpretation of Results

We hypothesized that after receiving a purpose intervention, students will have reduced depression scores compared to those who did not receive an intervention We found the results of

the current study to be in alignment with this prediction. Those who did receive a purpose intervention showed lower depressive scores than controls without an intervention over time. However, this only holds for participants of the purpose group who did improve on purpose after receiving the intervention, as the ones who did not improve were excluded. Reasons for non-improvement may be because the intervention was novel and not well developed enough, or simply because participation was part of a course requirement and students were not motivated enough, as extrinsic motivation may not facilitate active engagement as much as intrinsic motivation does (Schlechty, 2011). In addition, the participants from the purpose group who did not increase on purpose reported higher baseline purpose in comparison to those that increased in purpose. All participants did improve in depression over one week, however, administering a purpose intervention appears to have even further reduced depression severity for the intervention group as shown by a medium to large (Cohen, 2013) effect size ($\eta p^2 = .131$). For both depression time points together, groups did not differ, as initial depression levels are supposed to be similar. However, for the follow-up depression scores, the purpose group had lower depression scores than the controls as shown by a small to moderate (Cohen, 2013) effect size ($d = -.39$). This implies that a purpose intervention indeed can be a useful tool to tackle depression.

Comparisons with Previous Research

Further evidence for the connection between purpose and depression was found, in accordance with Pinquart's (2002) meta-analysis, where findings from 70 studies on purpose in life of middle and old-aged participants were synthesized. Though correlational, Pinquart found a medium effect size between purpose in life and depression ($r = -0.46$). Kim, Hayward, and Reed (2014) also found a strong negative relationship ($r = -0.67$) between purpose in life and depressive symptoms in their cross-sectional study with a sample of Korean elders further

suggesting this connection. This also aligns with Hedberg's, Gustafson's, Alèx's, and Brulin's findings (2010) from a cross-sectional study, where depressed elderly participants had lower scores on a purpose in life test compared to the non-depressed. In contrast to the previously mentioned studies, our design was experimental and able to confirm this connection by using causality-based methods. Further, instead of adults or old participants, our sample consisted of young adults, which suggests that the connection between purpose and depression appears to extend beyond age and can be useful for younger populations as well.

When comparing our sample with Ibrahim's, Kelly's, Adam's, and Glazebrook's findings (2013) from a systematic review, or Snyder's, de Brey's, and Dillow's (2016) summary of education statistics, which both examined variables from studies comparing students finding them to have higher depression rates than the general population, our student sample differs as it had overall low depression scores. This implies that even people with low depression can benefit from such an intervention, so it may be valuable for lower at-risk populations as well.

The benefit of a purpose intervention aligns with Bundick's study (2011), where he found a purpose intervention to benefit goal-directedness and buffer decline in life satisfaction when comparing college students in an experimental design with a control group. He suggests that purpose interventions can be beneficial when administered to young adults and that they should be further developed as well as administered outside of an educational context. As life satisfaction has been shown to be negatively correlated with depression (Koivumaa-Honkanen, Kaprio & Honkanen, 2004) and our intervention uses a further developed concept on purpose, our study follows up on this suggestion, by benefitting a student sample through decreasing depression. Still, as most of the initial participants did not profit on purpose levels, an intervention that is more tailored towards students may be more appropriate. This may be done

by including an element that reflects on one's possible future career as this can be a self-concordant, purposeful, and relevant life goal for them (Schippers & Ziegler, 2019). In accordance with these suggestions, some of the respondents of our study did also list future career-related life goals.

When comparing our study with previous clinical samples, such as Krause's (2007) cross-sectional study where purpose in life seemed to buffer depression for participants with trauma, or Lyon's and Younger's (2001) findings, where low purpose predicted depressive symptoms in HIV patients ($R^2 = 0.517$), we were able to further emphasize the connection, but with a non-clinical sample and a smaller effect size. We may have found a smaller effect size than Lyon and Younger because their sample was significantly older than ours and older people might be experiencing more purpose or meaning (Meier & Edwards, 1974; Steger, Oishi & Kashdan, 2009) and less depression (Christensen et al., 1999; Kessler et al., 2010). Still, this suggests that purpose can influence depression even outside of a clinical population.

In another clinical sample with cancer patients, Breitbart and his colleagues used a randomized controlled trial (Breitbart et al., 2012), to compare the IMCP with therapeutic massage and found no improvements for patients on depression, in contrast to our findings. This implies that an intervention focusing on purpose instead of meaning in general may be more effective in decreasing depression. As Breitbart and his colleagues (2012) also found no effects for hopelessness, this might be a mechanism explaining why purpose is more effective against depression, due to the connection of purpose with hopelessness (García-Alandete et al., 2019; García-Alandete, Gallego-Pérez & Pérez-Delgado, 2009; Grygielski et al., 1984). In addition, as comorbid medical illnesses can reduce the likelihood of successful recovery in patients treated for

depression (Franco-Bronson, 1996), this may also explain why the IMCP did not work for cancer patients' depression.

For Lee's MMi in a pilot study (Henry et al., 2010) patients with ovarian cancer were assigned to either receive the MMi-intervention or were part of a waitlist-control condition and those receiving an intervention increased on meaning with a small to medium effect size (d = -.424). Our study, in contrast, was less effective in increasing purpose, a facet of meaning, as only 16 out of the 51 who received the intervention improved on purpose. However, the participants for whom the intervention was effective in increasing purpose, did experience lower depression, whereas for the MMi no effect on depression was found when administering a meaning intervention (Henry et al., 2010). This may be because their sample consisted of cancer patients which may make them less likely to recover from depression (Franco-Bronson, 1996), or due to them using the Hospital Anxiety and Depression Scale, which does not measure depression exclusively and has been shown to be inconsistent (Coyne & van Sonderen, 2012). Nevertheless, given the prerequisite that purpose increases, such interventions can have the potential to mitigate depressive symptoms.

When looking at goal intervention studies, a cross-over design study by Coote & MacLeod (2012) found that those who received an intervention on goal setting and planning decreased in negative affect and showed trends towards significant decreases in depression compared with wait-list controls. This partly aligns, as both studies found a decrease in depression and focused on self-accordant goals, however, our goals were derived from higher purpose goals. Even though Coote's intervention was administered over 5 weeks, our much shorter intervention was also able to find a higher effect on depression in only one week. This suggests that such short-term interventions might be even more effective by using a higher-order

purpose goal to deduct lower-order goals. Another explanation may be that Coote's & McLeod's participants all had a long history of depression which may have made them more resistant to treatment (Thase, 2006).

Finally, when comparing our study with another goal-implementation intervention (Fritzsche, Schlier & Oettingen, 2016) the results line up as well. Fritzsche, Schlier, and Oettingen compared healthy participants with an intervention- and a waiting-control-condition and found a medium pre-to-post reduction in depression for the intervention group. This suggests that interventions focusing on goals can be useful against depression, whereas Fritzsche's intervention only did focus on smaller goals achievable in three weeks, based on positive aspects that achieving them would yield. Our intervention did include smaller goals as well, but these were derived from higher life goals. As such, listing of positive aspects might serve as another incentive for achieving smaller goals related to one's purpose.

To summarize, the connection between purpose and depression appears to extend beyond age and may be valuable for lower at-risk populations as well. Purpose can influence depression even outside of a clinical population and focusing on purpose instead of meaning, in general, may be more effective in decreasing depression. In addition, short-term interventions might be equally effective as long-term ones, by using higher-order purpose goals to arrive at long-term goals. Lastly, including positive aspects to make short-term goals, as well as tailoring the intervention more to students might improve purpose interventions even further.

Strengths and Limitations

As for this study's strengths, we were able to help in filling the gaps that previous meaning research has left. We were able to test a purpose intervention in an experimental design

with a control group (Shin & Steger, 2014), in a young, non-clinical population that was mostly disregarded by prior purpose (Hedberg et al. 2010; Kim, Hayward & Reed, 2014; Pinquart, 2002) and meaning research (Breibart et al., 2012, 2018; Lee et al., 2006). Furthermore, we have found an effect with an online intervention that was easy to administer and time-efficient. We also helped to contribute evidence to the relationship between purpose in life and depression. Lastly, the questionnaires of MDI and the purpose MEMS subscale we used are reliable questionnaires (Bech et al., 2001; Bech et al., 2015; George & Park, 2017; Marco et al., 2022) and showed high internal consistency in our sample.

Nevertheless, this study did face limitations that need to be addressed. Firstly, a huge proportion of the sample were female participants. Psychology is a female-dominated field, especially for undergraduates (Olos & Hoff, 2006), and females were shown to score higher on the MEMS, especially on the purpose subscale in a validation study with a non-clinical Spanish adult sample (Marco et al., 2022). As such, conclusions regarding other student samples should be made with caution. In addition, almost all the participants were either Dutch or German, and as such the results might not be generalizable to other cultures outside of Europe. Still, the relationship between purpose and depression has also been found in a huge Korean elderly adult sample (Kim, Hayward & Reed, 2014) as well as in the US with clinical samples (Lyon & Younger, 2001; Krause, 2007).

Another limitation was that from the purpose group, only participants who benefited from the intervention were included. As such, only a few participants were part of the intervention condition which led to groups being unequally distributed. Unequal groups can threaten statistical power and increase the type I error rate (Rusticus & Lovato, 2014) and as such, there is the

possibility that we have committed type I errors, so our results should be interpreted with caution. Future studies should try to prevent such shortcomings by setting stricter significance levels.

Lastly, the control group in this study was a no-treatment control. While essential for an experimental design, no-treatment controls are prone to problems of treatment fidelity effects and can make interventions appear more effective, so comparisons with established interventions are often preferred (Mohr et al., 2009). This makes it important to consider that the effect on depression may have been simply because an intervention was administered, regardless of its content. Participants were also aware that they were given some sort of intervention as they were completing exercises and were given homework, and knowledge of treatment can influence the outcome (Benedetti et al., 2003).

Directions for Future Research

Purpose interventions appear to be promising, especially for depression, and in the future, should be researched with even larger samples. However, as our intervention was ineffective for most of the participants, it needs more improvement. Upcoming studies may do this by trying to tailor the intervention more to students with a career-related element and by including positive aspects to devise short-term goals. More examples for other potential purpose interventions are also provided by Shin and Steger (2014).

It is also still unclear which exact mechanisms connect purpose and depression. It may be through increased optimism and motivation (Lapierre et al. 2001), better emotional recovery (Schaefer et al., 2013), positive feelings or pleasure (Ebersole, 1998; Wong, 1998), or something unbeknownst to us yet. Future studies should try to further inspect the working mechanisms to increase our understanding of the concept's nature (George & Park, 2016) and investigate

possible moderators and mediators (Shin & Steger, 2014), one of which could potentially be hopelessness (García-Alandete et al., 2019; García-Alandete, Gallego-Pérez & Pérez-Delgado, 2009; Grygielski et al., 1984).

Moreover, other mental disorders such as anxiety might also be improved by administering a purpose intervention (Kashdan & McKnight, 2013), and more research on different disorders is needed. Also, it is still left open how the other dimensions of mattering and comprehension would fare as an intervention, which should be of interest for upcoming studies.

Further, research in this field comparing different cultures is scarce (Henrich, Heine & Norenzayan, 2010) leading to results being generalizable only on a cultural but not on a universal level. As such, future research should also consider meaning intervention research in different cultures. Steger et al. (2008b) found that there appear to be differences between the west and east, so comparing the two might be an intriguing avenue for interventional and cultural research alike.

Shin and Steger (2014) also remarked that "empirical studies on the efficacy of meaning interventions outside of the context of illness or palliative care are still scarce" (pp.102). As this study did, future studies investigating the concept of meaning in life should also adhere to these suggestions in either new or replication studies.

It also needs to be noted, that the intervention was short-term and follow-up questionnaires were administered after only one week. While the intervention was effective, long-term research has many statistical benefits and should be used whenever possible (Fleming, 1999), especially when one wants to establish an intervention.

Finally, as purpose can be beneficial for different age groups (Hedberg et al. 2010; Kim, Hayward & Reed, 2014; Steger et al., 2008a; Steger, Oishi & Kashdan, 2009; Pinquart, 2002), more research directly comparing young adults and elders is needed in the future.

Conclusion

All in all, we have made a small step towards making use of purpose in the context of mental health. Current results indicate that purpose has the potential to be used as a short-term intervention to improve depression in students, paving a way for research and potential treatment in non-clinical, young adult populations. As the intervention was only effective in a few people it needs further development. Nevertheless, meaning intervention research still has a long way to go: More experimental designs are required in the future, meaning differences between certain age groups as well as different cultures need further uncovering, and the exact working mechanisms call for more investigation. Even so, research regarding meaning is continuing to grow and will become even more “meaningful” in the future to come.

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Appendix I: Tables

Frequencies of Sample

Table 1

Age Frequencies of Total Sample

	N	%
17	1	0.9%
18	21	18.9%
19	31	27.9%
20	19	17.1%
21	14	12.6%
22	15	13.5%
23	4	3.6%
24	1	0.9%
25	2	1.8%
26	1	0.9%
27	1	0.9%
30	1	0.9%

Note: $N = 111$

Table 2

Fluency Frequencies of Total Sample

	N	%
Not at all fluent	1	0.9%
Somewhat fluent	10	8.9%
Moderately fluent	24	21.4%
Almost completely fluent	56	50.0%
Completely fluent	21	18.8%

Note: *N* = 112

Table 3

Nationality Frequencies Total Sample

	N	%
Dutch	74	66.1%
German	26	23.2%
Other	12	10.7%

Note: *N* = 112

Table 4

Gender Frequencies

	N	%
Male	31	27.7%
Female	80	71.4%
Non-binary / third gender	1	0.9%

Note: *N* = 112

Manipulation Check Tables

Table 5

Statistics MEMS Purpose Scale

		Pre-MEMS	Post-MEMS
N	Valid	112	112
	Missing	0	0
Skewness		-.718	-.297
Std. Error of Skewness		.228	.228
Kurtosis		.437	.268
Std. Error of Kurtosis		.453	.453

Table 6

Descriptives MEMS Purpose Scale with Conditions

	condition	Mean	Std. Deviation	N
Pre-MEMS	control	20.85	5.35	58
	purpose	21.50	4.08	54
	Total	21.16	4.77	112
Post-MEMS	control	20.62	4.73	58
	purpose	21.00	3.61	54
	Total	20.80	4.22	112

Table 7

Levene's Test for Pre- and Post-MEMS

	df	Sig.
Pre-MEMS	110	.099
Post-MEMS	110	.038

Note: $N = 112$

Table 8

Independent Samples T-Test MEMS Purpose Scale

		Two-Sided p	Mean Difference	t
Pre-MEMS	Equal variances assumed	.470	6.55	.724
Post-MEMS	Equal variances not assumed	.633	3.79	.478

Note: *N* = 112

Main Analysis Tables

Table 9

Durbin-Watson Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.731	.535	.529	7.776	1.602

Note: *N* = 74

Table 10

Tests of Normality Shapiro-Wilk for MDI

	Shapiro-Wilk	
	Statistic	Sig.
Pre-depression	.961	.023
Post-depression	.898	<.001

Note: *N* = 74

Table 11

Descriptive Statistics Depression

	Condition	Mean	Std. Deviation	N
Pre-depression	Control	17.97	10.85	58
	Purpose	20.50	6.56	16
	Total	18.51	10.10	74
Post-depression	control	16.45	12.33	58
	purpose	12.06	5.53	16
	Total	15.50	11.33	74

Table 12

Depression Kurtosis & Skewness Descriptives

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
Pre-depression	.388	.279	-.758	.552
Post-depression	.839	.279	-.374	.552

Note: $N = 74$

Table 13

Mauchly's Test of Sphericity

Measure: Depression

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
Time	1.000	.000	0	.

Note: *N* = 74

Table 14

RM-ANOVA Pre-and Post-Depression; Purpose & Control Condition

Effect		Value	F	Sig.	Partial Eta Squared	Observed power
Time	Wilks' Lambda	.763	22.412	<.001	.237	.997
Time * condition	Wilks' Lambda	.869	10.831	.002	.131	.901

Note: *N* = 74

Table 15

Between-Subjects RM-ANOVA

Measure: Depression

	Partial eta Squared	Mean Square	F	Sig.
condition	.001	21.490	.107	.745

Note: *N* = 74

Post-Hoc Analysis Tables

Table 16

Independent Samples Levene's Test Post-Depression

		Levene's Test for Equality of Variances	
		F	Sig.
Post-Depression	Equal variances assumed	13.663	<.001

Note: *N* = 74

Table 17

Independent Samples T-Test Post-Depression

					95% CI lower	95% CI upper
		Two-Sided p	Mean Difference	t		
Post-depression	Equal variances not assumed	.044	-4.39	-2.060	-8.65	-.12

Note: *N* = 74

Table 18

Group Statistics T-Test on Post-Depression

	groups	N	Mean	Std. Deviation	Std. Error Mean
Post-Depression	control	58	16.45	11.22	1.62
	purpose	16	12.06	5.53	1.38

Note: *N* = 74

Descriptives for MEMS Purpose Scale New Sample

Table 19

Group Statistics Purpose Scale MEMS-Scores

	condition	Mean	Std. Deviation	N
Pre-MEMS	control	20.85	5.354	58
	purpose	18.63	4.60	16
	Total	20.37	5.25	74
Post-MEMS	Control	20.62	4.74	58
	purpose	22.25	3.91	16
	Total	20.97	4.60	74

Table 20

Descriptives for Intervention Group Purpose Gain

	Gain on purpose	N	Mean	Std. Deviation
Pre-MEMS	no increase	38	22.71	3.19
	increase	16	18.63	4.60
Post-MEMS	no increase	38	20.47	3.40
	increase	16	22.25	3.91

Table 21

T-test for Intervention Purpose Gain Groups Effect Size

		Point estimate
Post-depression	Cohen's d	-.390
	Hedges' correction	-.386
	Glass's delta	-3.56

Note: $N = 74$

Reliability Analysis of Questionnaires

Table 22

Reliability Statistics MDI

Cronbach's Alpha	N of Items
.911	12

Table 23

Reliability Statistics MEMS Purpose Scale

Cronbach's Alpha	N of Items
.882	5

Frequencies of Adjusted Sample

Table 24

Fluency Frequencies Adjusted Sample

	N	%
Somewhat fluent	5	6.8%
Moderately fluent	15	20.3%
Almost completely fluent	38	51.4%
Completely fluent	16	21.6%

Note: $N = 74$

Table 25

Nationality Frequencies Adjusted Sample

	N	%
Dutch	49	66.2%
German	16	21.6%
Other	9	12.2%

Note: *N* = 74

Table 26

Gender Frequencies Adjusted Sample

	N	%
Male	21	28.4%
Female	53	71.6%

Note: *N* = 74

Table 27

Age Frequencies Adjusted Sample

	N	%
17	1	1.4%
18	15	20.3%
19	19	25.7%
20	13	17.6%
21	11	14.9%
22	9	12.2%
23	3	4.1%
24	1	1.4%
25	1	1.4%
26	1	1.4%

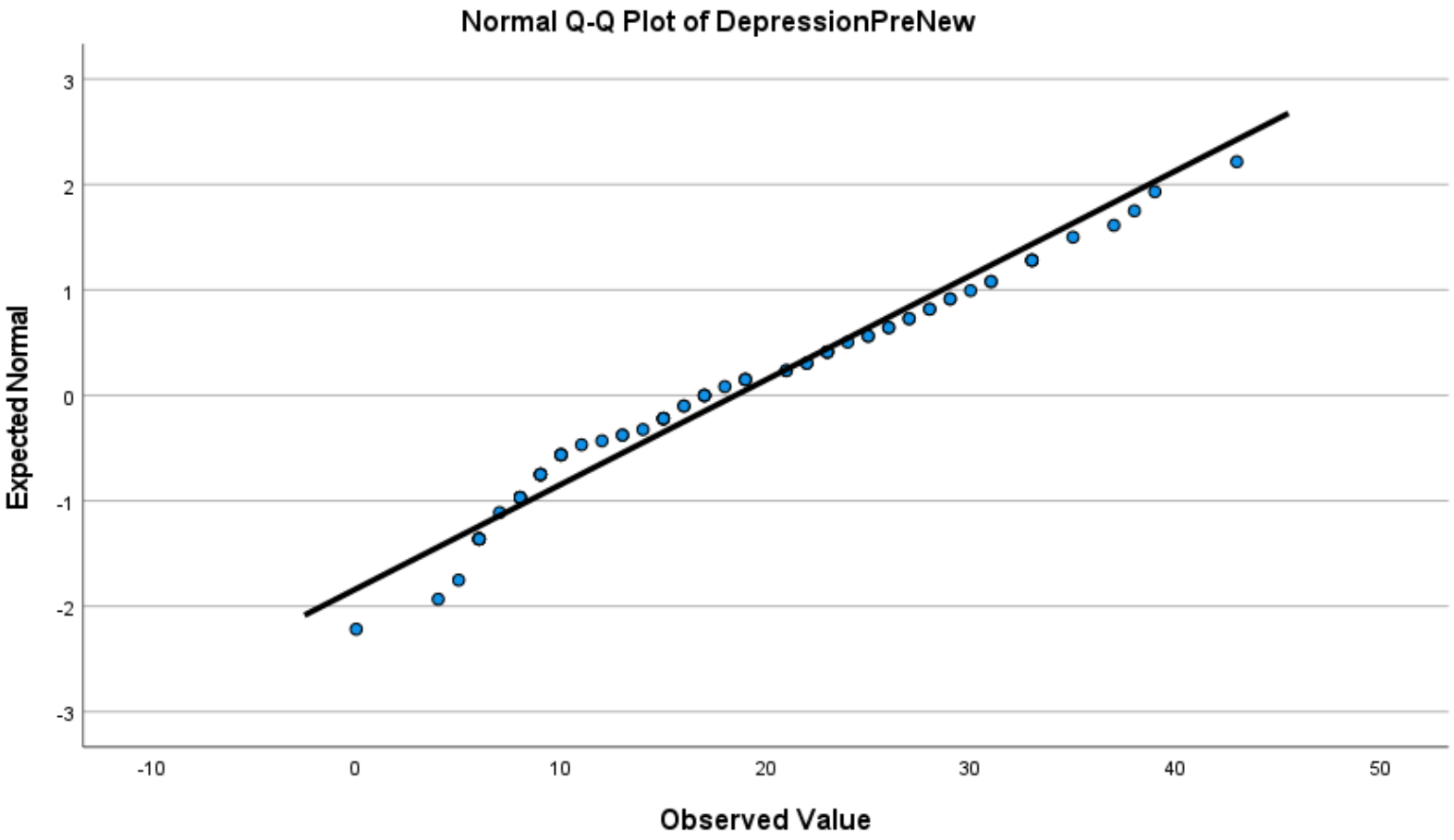
Note: $N = 74$

Appendix II: Figures

Figures

Figure 1

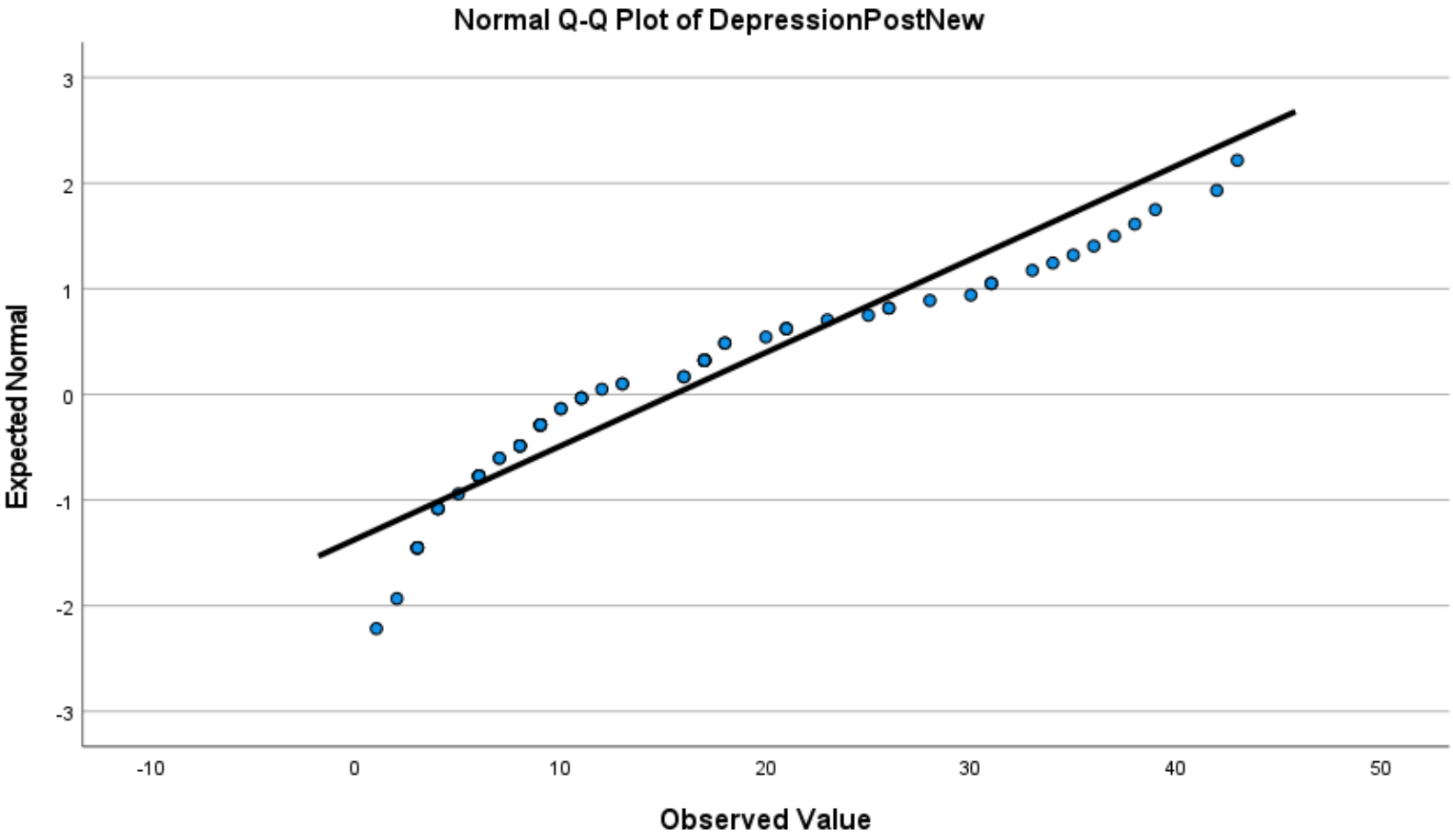
Residual Plot for Pre-Depression



Note: DepressionPreNew refers to pre-depression scores.

Figure 2

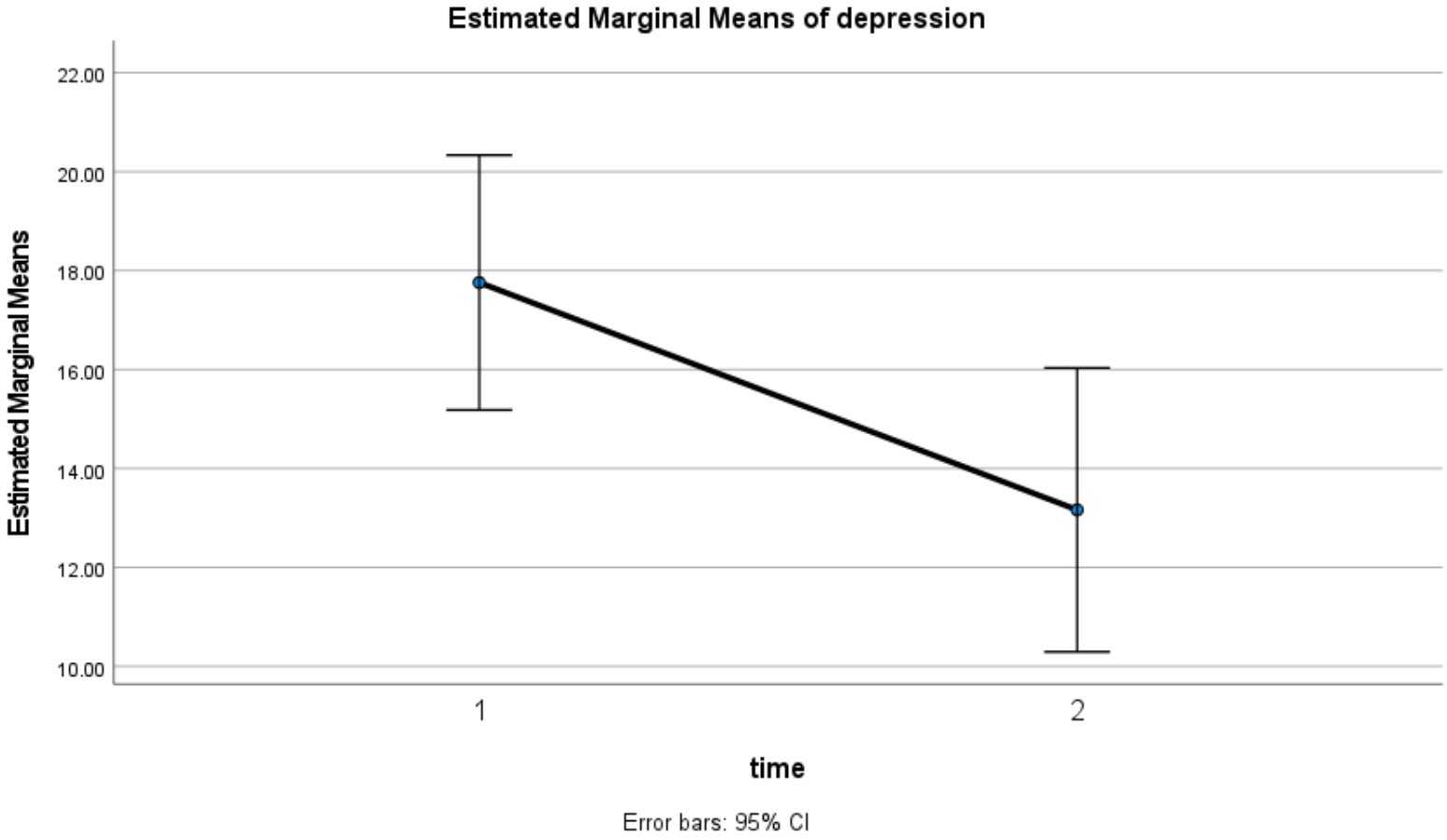
Residual Plot for Post-Depression



Note: DepressionPostNew refers to post-depression scores.

Figure 3

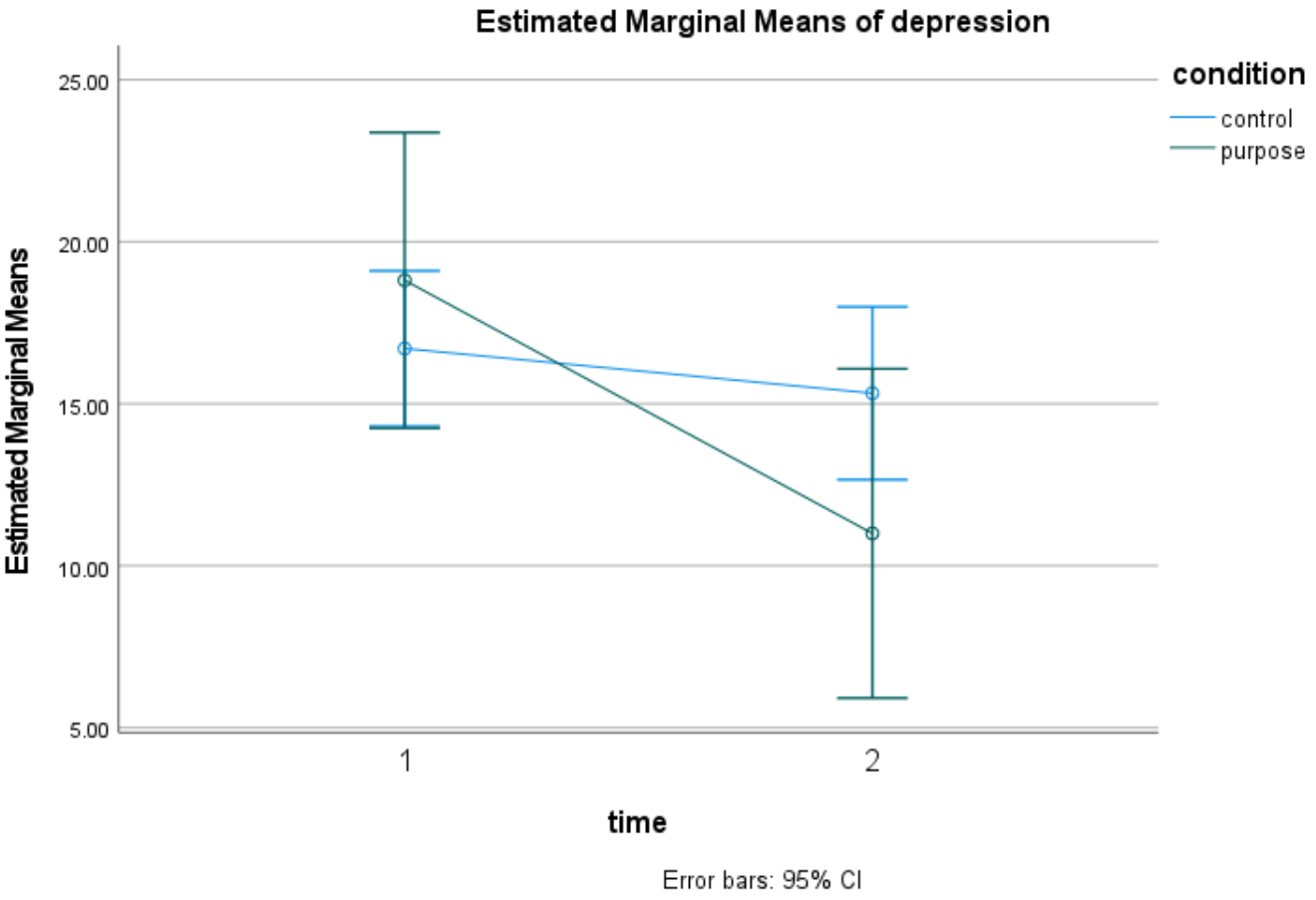
Marginal Means of Time (Pre-and Post-Depression)



Note: Graph depicting means of pre-(1) and post-depression (2).

Figure 4

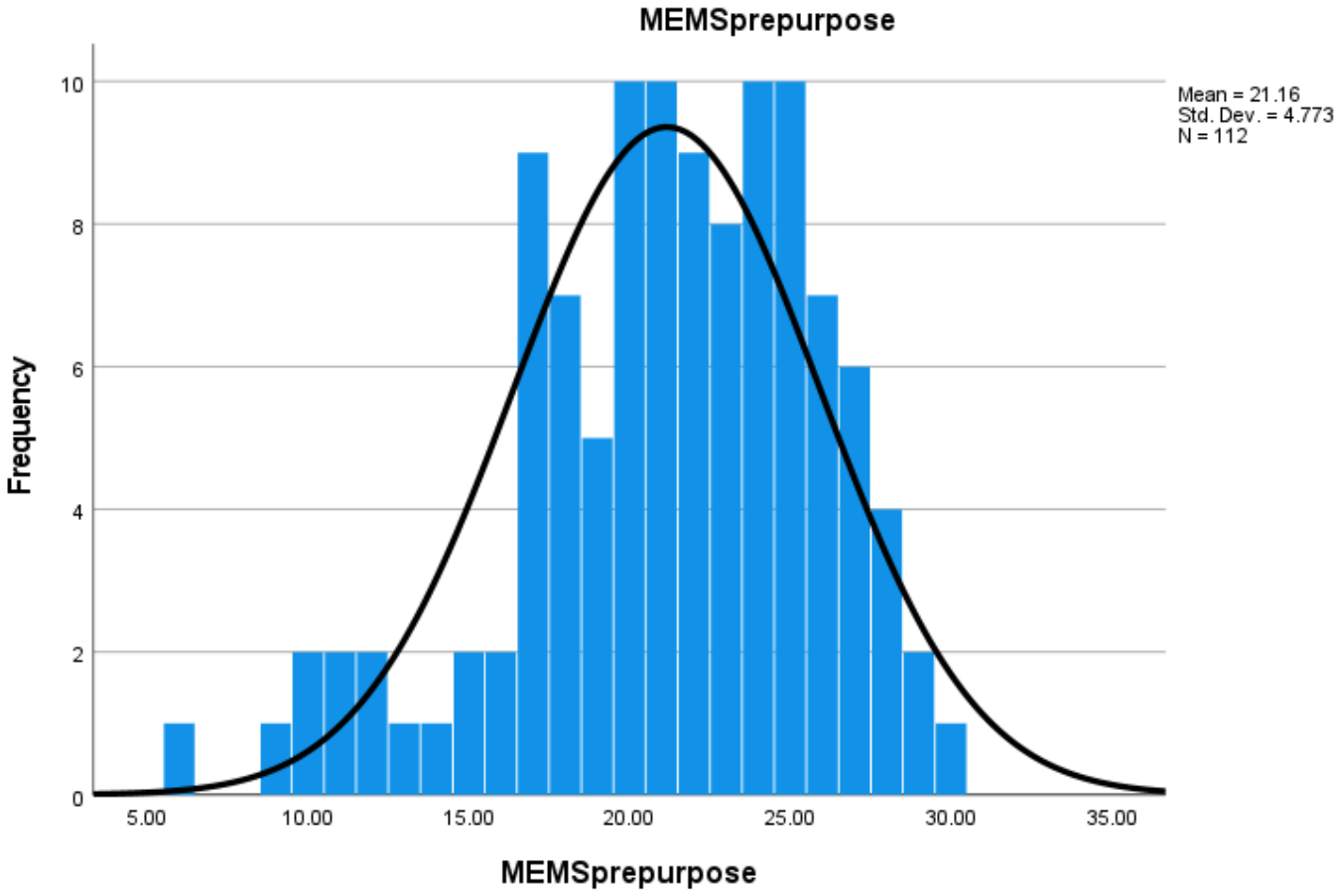
Marginal Means of Conditions (Control and Purpose) Over Time (Pre-and Post-Depression)



Note: Graph depicting means of pre-(1) and post-depression (2), for the groups of control (blue) and purpose (green). For the control group $N = 58$, and for the purpose group where the intervention worked $N = 16$.

Figure 5

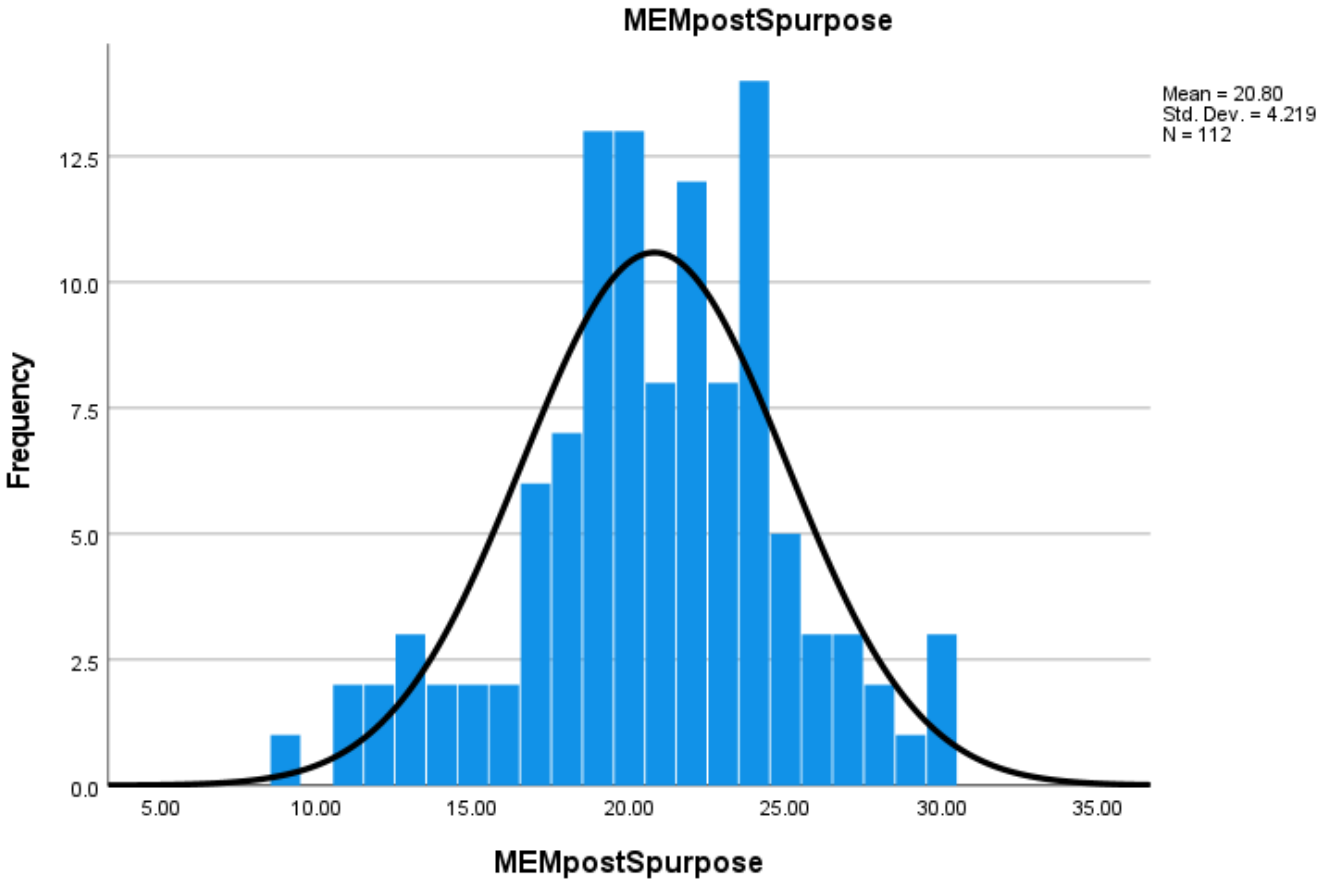
Histogram of Pre-MEMS Purpose Scale Scores



Note: MEMSprepurpose refers to pre-MEMS scores of the purpose scale.

Figure 6

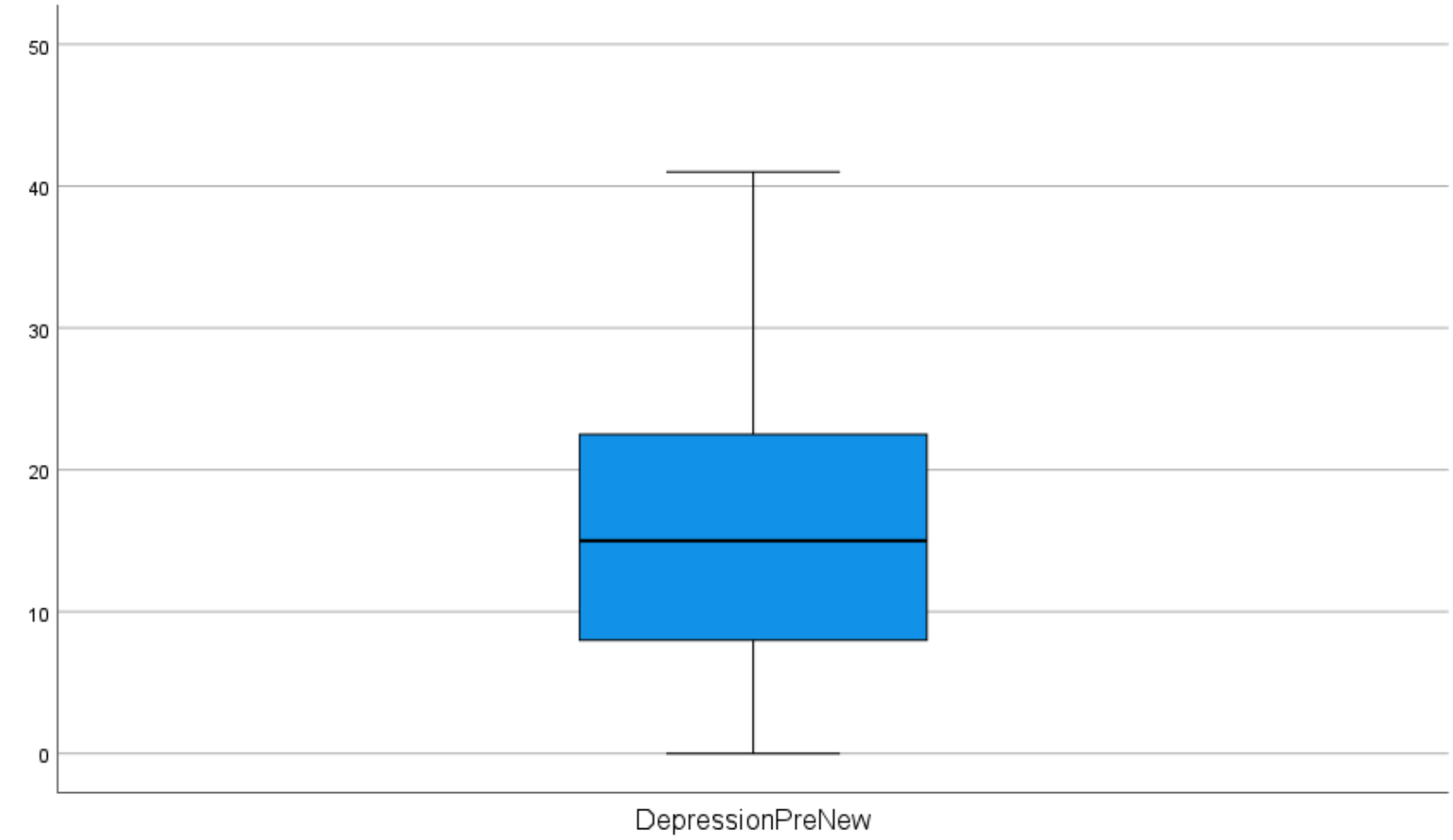
Histogram of Post-MEMS Purpose Scale Scores



Note: MEMSpostpurpose refers to post-MEMS scores of the purpose scale.

Figure 7

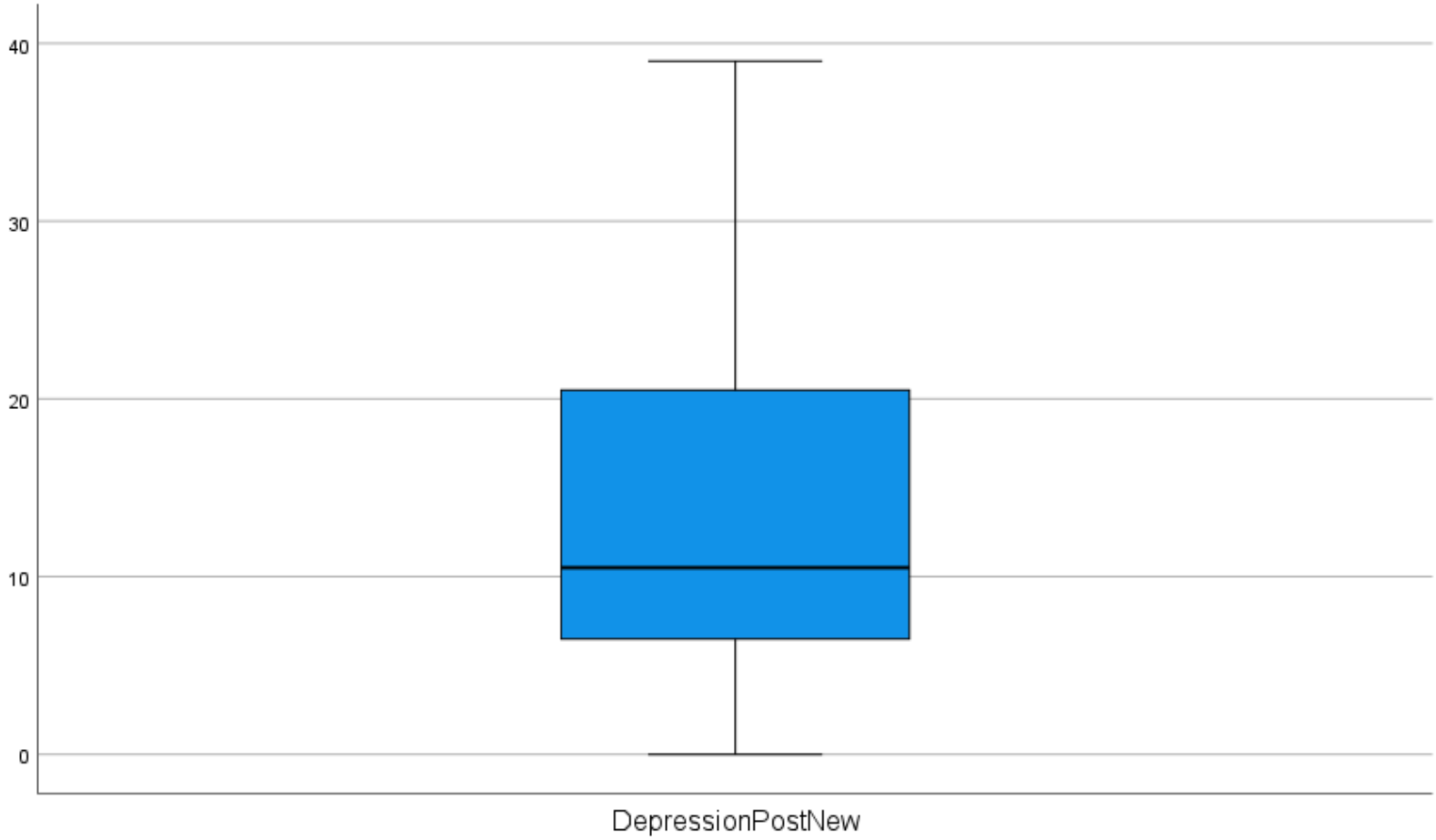
Pre-Depression Boxplot



Note: DepressionPreNew refers to pre-depression scores.

Figure 8

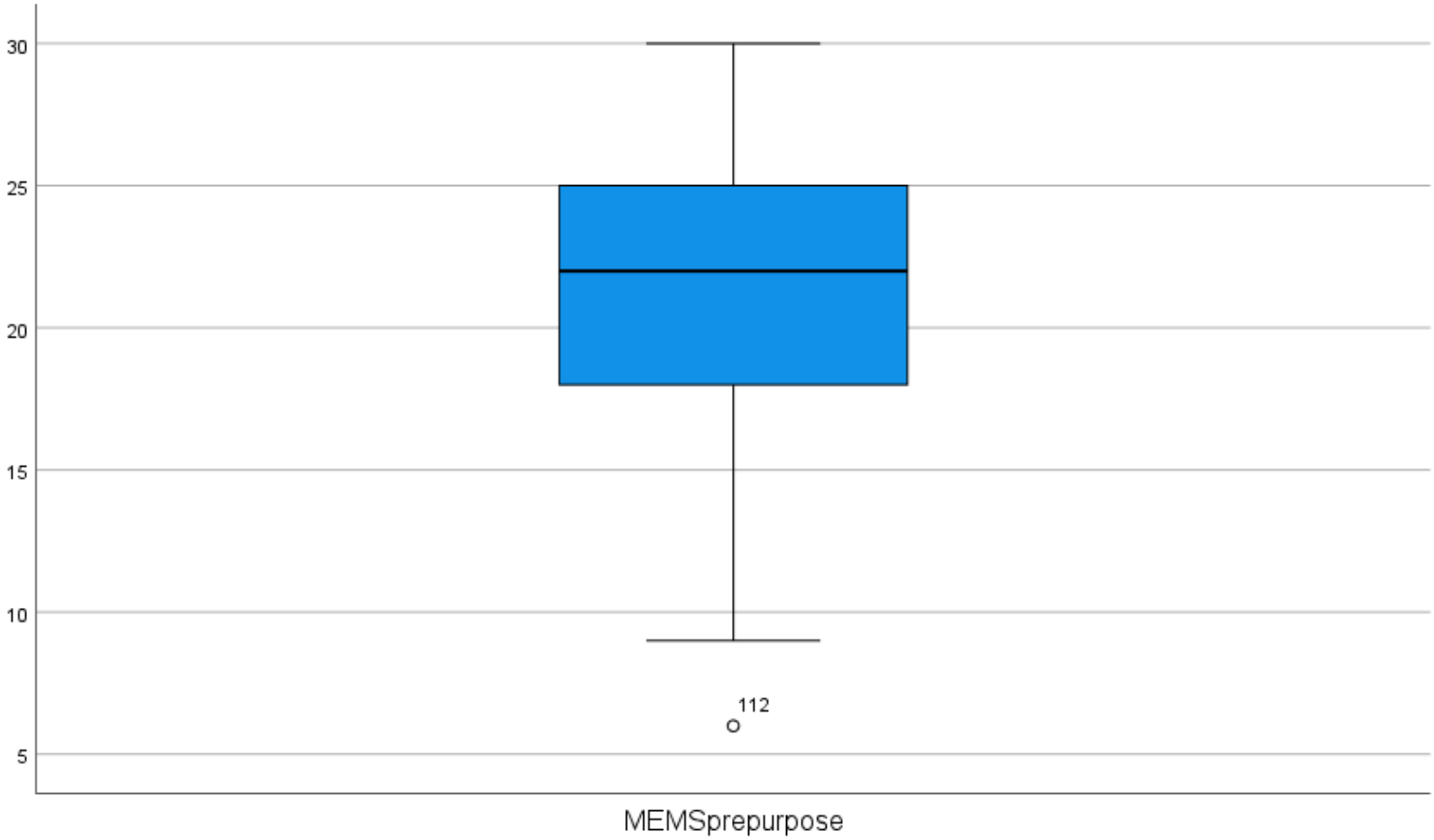
Post-Depression Boxplot



Note: DepressionPostNew refers to post-depression scores.

Figure 9

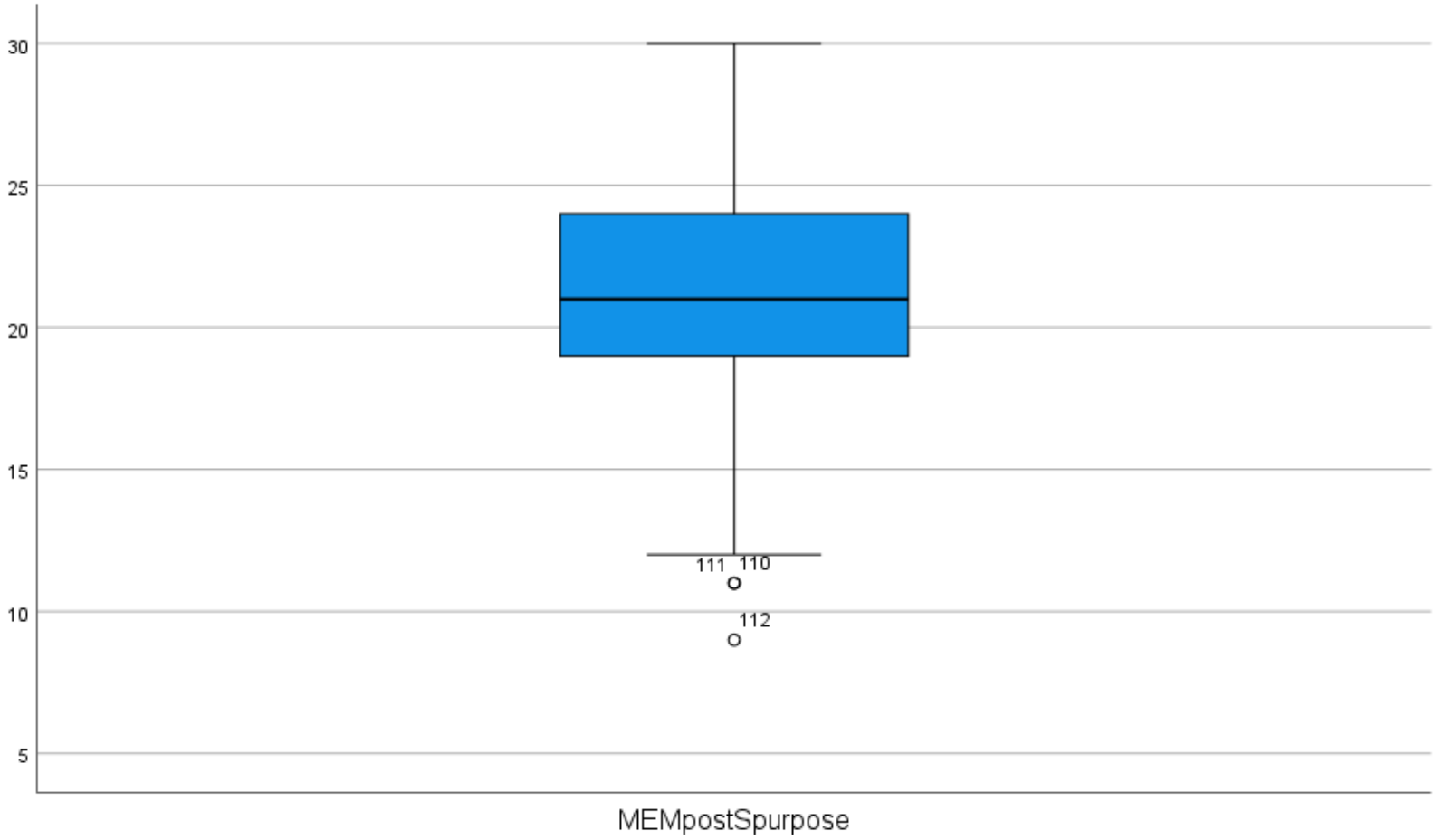
Pre-MEMS Boxplot



Note: MEMSprepurpose refers to pre-MEMS scores of the purpose scale.

Figure 10

Post-MEMS Boxplot



Note: MEMSpostpurpose refers to post-MEMS scores of the purpose scale.

Appendix III: Intervention Description

Purpose Intervention

Before starting, the participants were informed that this was a creative exercise, there were no right or wrong answers, the length was up to them, and they should approach each exercise in a serious, honest fashion.

For the first part, participants were asked about what they wanted to do with their life ("If you were free to do whatever you want with your life and money was not an issue, what would you like to do with your life? What kind of activities would you choose?") After being given 5 minutes to 10 minutes to type their answers to those questions in Qualtrics they were directed to the next exercise.

In this exercise, participants were asked to write done what their ideal version of themselves would be or what they aim to become in the future. For inspiration, they could think about people they admire or strive to be or attributes or characteristics they want to develop. The participants had between 5-and 10 minutes to complete this section.

Afterward, the participants were asked to list at least 3 of their most important values or core values. The participants were given a list of values for inspiration such as obedience, politeness, and ambition from overarching categories of honesty, health, spirituality, love, and social justice.

Participants were then instructed to formulate three life goals, three related long-term goals (achievable within the next 6 months to 5 years), and three related short-term goals (achievable within the next 7 days). After being instructed to note the goals on a piece of paper for a later review they were asked to provide a behavior, a time, and a location for when they intend to

pursue their short-term goals. Again, they were provided with an example: “I will buy flowers at 3.00 pm on Monday at the Jumbo.”

As homework, they were instructed to write down an activity that will bring them closer to achieving one of these goals, every evening for the next week.