**Assessing the self-reference effect in memory in social anxiety using signal detection approach (preregistration)**

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**Background:**

The self-referent encoding task (SRET) is a common paradigm used to measure self-views and self-referent encoding (Beevers et al., 2019). When completing the SRET, participants are asked to make a binary choice about whether adjectives presented to them are self-descriptive or not. The SRET provides data about the self-endorsed adjectives, reaction times (RT’s) and recollection of traits a short period of time after completing the task.

Although the SRET is commonly used to measure self-referent cognition in depression, many different metrics can be obtained. In a previous study which investigated the strongest predictor of the SRET outcomes to predict depression severity (Dainer-Best, Yeon-Lee, Shumake, Yeager & Beevers, 2018), SRET metrics associated most strongly with depression severity included number of words endorsed as self-descriptive and rate of accumulation of information required to decide whether adjectives were self-descriptive (i.e., drift rate, v).

Endorsement and RT data can be combined to produce drift rates for each category of adjectives (based on EZ diffusion model; Wagenmakers, 2007). A very positive drift rate indicates that is easy to categorize such words as self-referential; a drift rate close to zero indicate that is difficult to categorize such words and a strongly negative drift rate reflects that evidence accumulation often leads to rejection a stimulus as self-referential.

In the present study we seek to investigate the association between interpersonal self-views and social anxiety (SA) using the SRET, above and beyond depression symptoms severity. Additional goal of this study is to investigate self-reference effect in memory in social anxiety using signal detection theory (SDT) approach.

The goal of the SDT is to estimate two main parameters from the experimental data: (a) d’, which indicate the strength of the signal (relative to the noise) and can be also described as the ability of the cognitive system to differentiate between external triggers of varying intensity, and (b) β, which reflects the strategy of response of the participant of being more willing to make a decision (Abdi, 2007). In this experiment, we use the SDT approach with one major difference, our “signal” will be actually computed from the number of recalled words which was also endorsed in the first phase of the task (See table A).

|  |  |  |
| --- | --- | --- |
| Table A: Clarification to the SDT approach | | |
|  | Participants recollection (“Decision”) | |
| “Reality” | Recalled (“Yes”) | Not Recalled  (“No”) |
| Endorsed  (“Signal present”) | Hit | Miss |
| Not endorsed  (“Signal absent”) | False Alarm | Correct rejection |

**Hypotheses:**

*Our hypotheses based on a pilot study (detailed below). All of our hypotheses regard social anxiety above and beyond depression symptoms severity.*

**H1**: SA and interpersonal self-views of affiliation and domination.

(*H1.a*) SA severity will be negatively associated with high dominant self-endorsed words and drift-rate.

(*H1.b*) SA severity will be positively associated with low affiliative self-endorsed words and drift-rate.

**H2:** Self-reference effect in memory in social anxiety by the SDT approach.

**(***H2)* We predict that SA will be negatively corelated with signal detection theory

parameters (e.g. d’ and β), for dominant adjectives but not for affiliative adjectives.

**Measures**

*Questionnaires:*

**Social Anxiety**. Measured by two self-report questionnaires which asses cognitive, affective, somatic and avoidant symptoms of social anxiety (SPIN – Connor et al., 2000; LSAS-SR – Fresco et al., 2001). Questionnaires scores will be standardized and combined into composite variable for SA severity (SAD).

**Depression**. Measured by Beck Depression Inventory II (BDI – Beck et al., 1996), a self-report questionnaire which assess affective, cognitive, motivational and somatic symptoms of depression.

*Variables:*

**Endorsed adjective***.* The number of endorsed adjectives will be computed for each category (positive/ negative; affiliative/dominant).

**Drift rates (v).** Endorsement and RTs will be combined to produce drift rates for each category (based on the EZ diffusion model; Wagenmakers, 2007).

**d' and β**. As was mentioned before, recalled and endorsed adjectives from each category will be combined to produce the SDT paraments for each individual (based on Stanislaw & Todorov, 1999; Abdi, 2007, Karmon-Presser & Meiran, 2018).

**SRE (self-reference effect) Ratio**. Represent differences between endorsed and not endorsed words in the recollection phase, accounting for individual differences in endorsement. Higher scores indicate higher self-endorsed adjectives recalled compared to not-endorsed adjectives recalled (beyond individual attribution style).

**Previous Data.**

***Participants.*** Initial sample consisted of 106 undergraduate psychology students from Bar-Ilan University. 8 participants were excluded from the sample because of our exclusion criteria (detailed below). Final sample consisted of 98 participants, 81 women (82.7%).

|  |  |  |
| --- | --- | --- |
|  | Mean | SD |
| Age | 22.53 | 1.55 |
| BDI | 7.27 | 6.09 |
| SPIN | 17.95 | 13.90 |
| LSAS | 40.97 | 21.83 |

***Sample Descriptive.***

***Procedure.*** Participants presented with 44 adjectives (22 dominant and 22 affiliative) during the SRET task (see stimuli table in the appendix). For each category we selected half for each valence (positive or negative). Participants were asked to make a binary decision about whether each word presented to them describes them or not, by choosing the “me” or “not me” button on the computer’s keyboard. After completing the SRET task, participants have been given a one-minute resting period and then asked to recall as many traits as they can remember. Next participants completed questionnaires addressing demographic details, social anxiety and depression symptoms severity.

***Stimuli selection.*** 11 traits were chosen for each category during team discussions and based on our lab’s prior validation of social-rank and affiliation stimuli work in validation (Gilboa-Schechtman et al., 2017).

***Results:***

1. Correlations between social anxiety, depression and **endorsement** in each category:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | High Affiliative | High Dominance | Low Affiliative | Low Dominance | Total Affiliative | Total Dominance |
| SAD | -.045 | -.527\*\* | .281\*\* | .322\*\* | .274\*\* | -.450\*\* |
| BDI | -.123 | -.257\* | .326\*\* | .355\*\* | .297\*\* | -.145 |
| SAD (Controlling BDI) | .021 | -.477\*\* | .141 | .175 | .149 | -.442\*\* |
| \*Correlation is significant at the 0.05 level  \*\*Correlation is significant at the 0.01 level | | | | | | |

1. Correlations between social anxiety, depression and **drift rates** (**v**):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | High Affiliative | High Dominance | Low Affiliative | Low Dominance |
| SAD | -.021 | -.502\*\* | .299\*\* | .200\* |
| BDI | -.007 | -.326\*\* | .261\*\* | .196 |
| SAD (Controlling BDI) | -.021 | -.413\*\* | .200\* | .119 |
| \*Correlation is significant at the 0.05 level  \*\*Correlation is significant at the 0.01 level | | | | | |

1. Correlations between social anxiety, depression and **d’**:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | d’  Positive | d’  Negative | d’  Affiliation | d’  Dominance |
| SAD | -.120 | .054 | -.112 | -.248\* |
| BDI | -.151 | .021 | -.034 | -.148 |
| SAD (Controlling BDI) | -.051 | .051 | -.110 | -.202\* |
| \*Correlation is significant at the 0.05 level  \*\*Correlation is significant at the 0.01 level | | | | | |

1. Correlation between social anxiety, depression and **β**:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | β Positive | β Negative | β Affiliation | β Dominance |
| SAD | -.498\*\* | -.072 | -.038 | -.270\*\* |
| BDI | -.312\*\* | -.044 | .047 | -.219\* |
| SAD (Controlling BDI) | -.415\*\* | -.058 | -.072 | -.189 |
| \*Correlation is significant at the 0.05 level  \*\*Correlation is significant at the 0.01 level | | | | | |

1. Correlation between social anxiety, depression and **Self-Reference Effect** **In memory:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | SRE  Total | SRE  Affiliation | SRE  Dominance |
| SAD | -.277\*\* | -.085 | -.201\* |
| BDI | -.138 | .002 | -.054 |
| SAD (Controlling for BDI) | -.243\* | -.101 | -.202\* |
| \*Correlation is significant at the 0.05 level  \*\*Correlation is significant at the 0.01 level | | | | |

**Present Study.**

**Participants.** We aim recruit American participants online via Amazon M-Turk.

Based on correlations found in our pilot study we used G\*Power software to determine our sample size. Statistical power was set to 0.8, alpha was set to .05. Based on this, a sample size of ~150 was calculated.

***Procedure.*** The procedure in the present study will be identical to our pilot study’s procedure with two minor changes:

- We will increase the number of stimuli in each category from 11 to 30 traits.

- Participants will be recruited online

***Exclusion criteria:***

* Participants with no variance in the questionnaires or incomplete data.
* Participants who recalled 3 or less traits in the recollection phase.
* Participants who indicated more then 90 percent of the words to any category in the attribution phase.
* Participants completing the survey from the same locations.
* Participants who answered more then 10 percent of the trials under 200 ms.

***Statistical analyses.*** *We aim to conduct the same analyses preformed on the pilot study. Regression models will assess the association between the SRET variables with SA severity, controlling for depression severity.*

**Appendix**

Pilot stimuli table (Translated from Hebrew. Based on: Abele & Uchronski, 2008; Gilboa-Schechtman et al., 2017):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Low Dominance** | **Low Affiliation** | **High Dominance** | **High Affiliation** | # |
| Passive | Egoistic | Assertive | Kind | 1 |
| Loser | Apathic | Prominent | Empathic | 2 |
| Submissive | Disconnected | Proud | Good-Hearted | 3 |
| Ridiculous | Distant | Dominant | Considerate | 4 |
| Pathetic | Nasty | Decisive | Nice | 5 |
| Lame | Loner | Strong | Pleasant | 6 |
| Coward | Cold | Charismatic | Tolerant | 7 |
| Humiliated | Impervious | Leader | Supportive | 8 |
| Inferior | Sarcastic | Successful | Helpful | 9 |
| No One | Alienated | Influential | Attentive | 10 |
| Easily affected | Aloof | Authoritative | Listener | 11 |

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