Study proposal
Dialectical behaviour therapy (DBT) for people with autism, emotion regulation difficulties and self-harm behaviour: a single case experimental design & qualitative study

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Background

Autism spectrum disorder (ASD) includes a set of heterogeneous neurodevelopmental conditions, characterized by early-onset difficulties in social interactions and unusually restricted interests and repetitive behaviour (Lai, Lombardo & Baron-Cohen, 2014). The worldwide prevalence is estimated to be 1–2% in large scale surveys (Lai, Lombardo, Baron-Cohen, 2014). Over 70% of people with autism have comorbid conditions, such as anxiety, depression, and personality disorders. Also, behavioural difficulties frequently co-occur, such as aggressiveness (≤68%), self-injurious behaviours (≤50%) and suicidal ideation or attempts (11-14%) (Lai, Lombardo & Cohen, 2014). Non-suicidal self-injury is commonly performed as an emotion regulation strategy, as it often decreases the experience of negative affect (Andover & Morris, 2014).

Emotion Regulation (ER) is the process in which emotions are evaluated, maintained and adapted by means of specific strategies (Restory et al., 2024). These strategies can be divided into two categories: adaptive and maladaptive strategies. Problem solving, acceptation and reappraisal are examples of adaptive strategies. Examples of maladaptive strategies are suppression, rumination and behaviours leading to self-injury (Aldoa et al., 2009). Meta-analyses show that in individuals diagnosed with mental disorders, adaptive strategies are positively correlated with well-being, such as positive affect, while maladaptive strategies generally are negative correlated (Kraiss et al. 2020; Hu et al, 2014).

Gross (1998) proposed a process model of emotion regulation, which consists of the following five stages: (1) selection of the situation, (2) situation modification, (3) attention shift, (4)

cognitive change, and (5) response modulation (Gross, 1998). Non-suicidal self-injury or self-harm can be used in all five different stages of the emotion regulation process to regulate emotions. For example, self-harm behaviours may shift the focus from emotional pain to physical sensations (stage three), or they can be used as self-punishment to relieve feelings of guilt (stage four) (McKenzie & Gross, 2014). One study performed an in-depth analysis of self-injury specifically in autistic individuals and concluded that the most common functional purpose was to regulate low-energy affective states like depression or numbness (Moseley et al, 2020). All in all, self-harm is frequently used as emotion regulation strategy in autistic individuals, with an odds ratio of 3.18 (Blanchard et al., 2021). Existing therapies for emotion regulation problems, like cognitive behavioural therapy or mindfulness-based interventions, fall short for treating suicidal behaviour linked to emotion dysregulation (Huntjens et al., 2024). One qualitative study showed that more than two third of the autistic participants themselves felt that treatments like cognitive behavioural therapy were not effective, especially if it was not adapted to their needs (Camm-Crosbie et al., 2018). Therefore, there is a need for a new therapy that is adapted to ASD, which addresses emotion regulation, in order to decrease maladaptive strategies and increase adaptive strategies.

A promising therapy to address emotion regulation and self-harm is dialectic behavioural therapy (DBT). DBT is a therapy initially developed for individuals diagnosed with borderline personality disorder, for treating suicidal thoughts and maladaptive emotion regulation (Neacsiu et al., 2014; Huntjens et al., 2024), but it has been applied to several other psychiatric disorders such as eating disorders (Safer et al., 2001; Telch et al., 2001), substance abuse disorder (Dimeff & Linehan, 2008) and problem gambling (Christensen et al., 2013). DBT consists of four aspects: individual therapy, skills training (usually in group form), emergency telephone consultation, and therapist consultation meetings (Rizvi et al., 2012). A meta-analysis showed overall a transdiagnostic decrease of anger and a non-significant decrease of aggression after DBT (Ciesinski et al, 2022) and another meta-analysis showed a decrease in self-harm and suicidal thoughts in adolescents (Kothgassner et al., 2021). One RCT examined the effect of DBT on suicidal thoughts and ideation, particularly in individuals diagnosed with ASD (Huntjens et al., 2024). DBT significantly lowered suicidal ideation and suicidal attempts compared to treatment as usual. The significant difference, however, was lost at 12 months as the beneficial effects of treatment as usual began to approach the DBT effects. A paper on the secondary effects of this DBT treatment concluded that social functioning and quality of life were significantly improved and remained enhanced at 12 months (Huntjens et al., 2024b). While the effects of the treatment seem promising, there is a lack of understanding regarding the mechanisms of how effects are achieved, the temporal progression of changes during treatment, and individual differences in the responses to the treatment. It is unclear whether reductions in maladaptive emotion regulation or improvements in well-being are related to the skills learned during DBT. Also, individuals with ASD often experience sensory overload, which entail hypo or hyperreactivity to sensory stimuli or specific interest in sensory stimuli of the environment (American Psychiatric Association, 2013). It is plausible that maladaptive emotion regulation strategies are associated with sensory overload, but the temporal dynamics have not been studied in DBT. In addition, it is not clear how the treatment is perceived by patients with autism and what they consider as helpful aspects.

Therefore, this study uses mixed methods to understand the effects of DBT, whether there are temporal associations between, used skills, sensory overload, maladaptive emotion regulation strategies and well-being, and how the treatment is perceived by patients.

For the first three research questions, a single case experimental design (SCED) will be used:

1. What is the effect of DBT on maladaptive emotion regulation strategies and emotional well-being in patients with ASD?
2. Is the use of DBT skills associated with a reduction in maladaptive emotion regulation strategies and an increase of emotional well-being over time?
3. What are the dynamics over time between maladaptive emotion regulation strategies, emotional well-being and sensory overload?

4. Is there a clinical improvement in emotion regulation (DERS), social behaviour (VIS-V), and generic psychopathology and functioning (OQ-45) after DBT-treatment?

For the fifth research question, a qualitative study will be conducted:

5. What are the perceptions and experiences of patients with ASD regarding the impact and utility of DBT, including its specific components?

Research design and procedure

Two studies will be performed to address the research questions: 1) a SCED with a non-concurrent multiple baseline and 2) a qualitative study.

1) SCED study

The SCED consists of a baseline phase (A), a treatment phase (B), divided in a learning (B^1) and an equally long repetition phase (B^2), and follow-up phases after six (F^1) and twelve months (F^2). Measurements will be administered daily. The A phase varies between 15 and 35 days, the B phase is twelve months, and the F phases 14 days each.

Randomly assigned different baseline lengths are assigned in two steps to maximize internal validity. First, three time series of seven consecutive days will be formed: 15-21, 22-28 and 29-35 days. Secondly, participants will be randomly assigned to a time series and a random starting point within that time series. Each time series will hold a minimum of one participant and a maximum of three participants, depending on the number of participants included in the study. This means that there will be a minimum of three starting points and a maximum of nine starting points.

Participants will complete several questionnaires at two time points in the study: at the start of baseline (T1) and at the end of the treatment phase (T2).

2) Qualitative study

The qualitative study will consist of semi-structured interviews with the participants at the end of the B phase.

Population, recruitment and informed consent

The sample consists of patients of GGZ Friesland who are indicated for DBT and have given consent to participate in this study. The intake team will screen participants for their eligibility. Eligible patients will be informed about the study and given an information brochure with informed consent form. After signing, the informed consent form will be scanned and added to the electronic patient file. The paper files will be stored in a restricted area at the research department at GGZ Friesland.

Inclusion and exclusion criteria

Inclusion criteria are:

- Minimum age of 16 years;
- DSM-V diagnosis of ASD;
- Sufficient understanding, as demonstrated in conversation with intake therapist;
- Explicit behavioural problems, which, according to patient and therapist, lead to functional problems (like suicidal ideation, auto mutilation, emotional outburst and interpersonal conflicts);
- BMI > 17;
- Commitment to the therapy and shared goals as assessed by intake therapist;

Exclusion criteria are:

- Antisocial behaviour which interrupts the group climate;
- Presence of a trauma-related disorder that is likely to interfere with the ability to engage effectively in DBT or that requires specialized trauma-focused treatment prior to or alongside DBT as assessed by intake team;
- Excessive dependency on substances for which no parallel appropriate policy can be made;
- Diagnosis of psychotic disorder if not stable;
- Diagnosed with bipolar disorder.

Sample size

In a SCED the effects of a therapy within individuals are examined, the aim is not to understand mean differences that apply on a population level. The What Works Clearinghouse (WWC) standards for SCEDs state that there should be at least three attempts to demonstrate effect for internal validity (Singh et al., 2022). In a multiple baseline design with different baseline durations, this results in a minimum sample size of three participants. A maximum of nine participants can join the DBT treatment and in an earlier performed feasibility study, all five patients which enrolled into treatment were included in the study. We therefore expect to include at least three patients.

Furthermore, the WWC standards for SCEDs state that at least 5 datapoints per phase are necessary. Since each phase is at least two weeks and thus has 14 datapoints, we expect sufficient datapoints to demonstrate an effect of the intervention.

For the qualitative study, we hope to include at least six patients in order to find saturation of the themes.

Measurement instruments

Study 1 SCED

Primary outcomes

A digitalized version of the paper DGT diary will be used (Linehan, 2016) with several adaptations. The diary will be administered daily as part of the treatment protocol via an encrypted SMS link. The diary can be filled in between 17.00 hours and 22.30 hours. The daily diary card consists of six questions measuring the urge for emotion regulation strategies/self-harm behavior, two questions on emotional well-being, three questions about sensory overload, two questions about giving in to an urge and 31 questions about whether they deployed the skills they learned in treatment.

The following emotion regulation strategies are questioned:

- Suicidal thoughts/behaviours;
- Self-harm;
- Eating problems;
- Substance abuse;
- Temper tantrums;
- Other behaviour.

An average of the six strategies will be calculated to create the variable *maladaptive emotion regulation strategies*. *Emotional well-being* is averaged from the questions emotional suffering and happiness. The original outcomes were a 5-point Likert scales, but the current diary contains continuous scales from 0 – 100, as this scale is better able to distinguish smaller relevant fluctuations over time.

The original Linehan diary contained open questions about which form of self-harm was used and which other behaviours were exhibited. This is changed to one question whether they acted upon their urge and one question about what they have done. Moreover, three questions about sensory overload are added.

This diary is used in treatment to give insight into patterns of emotion regulation and discuss during the weekly meetings. All daily diary data will be collected using the Routine Outcome and QUlity Assessment (RoQua) system, which is consortium for specialized mental health care institutes in the Netherlands (Systema & van der Krieke, 2013). RoQua is a questionnaire system that can be added to the electronic patient file. Through preparing protocols, questionnaires can be sent to patients at specific timepoints and on specific days.

In the pilot study, missing data from the daily diaries ranged between 7.7% and 77.3%, with all participants having more than 20% missing data in the intervention phase. Therefore, we will include a monetary incentive for filling out the daily diary. For participants that fill out ≥70% of the diary, which is an equivalent of 5/7 diaries per week, a compensation of €70 will be

rewarded.

Secondary outcomes

Secondary outcomes are social behaviour (measured with the *VIS-V* (Hortwitz et al, 2013)), difficulties in emotion regulation (measured with the *DERS* (Gratz & Roemer, 2004)) and generic psychopathology and functioning (measured with *OQ-45* (de Jong et al., 2009)) measured at four timepoints: at the start of the baseline phase (T1), at the end of the treatment phase (T2), at six-month (T3) and 12-month follow-up (T4).

Treatment adherence

Treatment adherence will be measured with the checklist for adherence to dialectic behaviour therapy (DBT AC-I) by Harned et al (2021). The Dutch translated version by Huntjens et al. will be used. An independent rater will use the checklist and rate adherence based on audio-tapes of individual therapy sessions.

Study 2 Qualitative

A semi-structured interview will be applied.

Data analysis

Study 1 SCED

Research question 1

Hypothesis 1: We expect a decrease in urges for maladaptive emotion regulation strategies and an increase in emotional well-being during the treatment phase compared to baseline.

To test this, we will use descriptive statistics, visual analysis, and effect size calculations including Non-overlap of All Pairs (NAP), Tau-U, and standardized mean difference (SMD), following Manolov et al. (2021). Variability measures (e.g., standard deviation, variance) will be calculated to assess changes in variability across phases.

Emotion regulation will be assessed using the average score of the six items and two individual measures: each participant's two most frequently used strategies, identified at intake.

Hypothesis 2: We expect a greater decrease in urges for maladaptive strategies and a greater increase in emotional well-being in treatment phase B^2 (repetition) compared to B^1 (learning), relative to baseline.

The same analytic approach will be applied.

Hypothesis 3: We expect a delayed and gradual treatment effect.

To test for statistically significant differences between phases, a randomization test will be used. While most single-case randomization tests target immediate and abrupt effects, the anticipated delayed and gradual change, based on clinical experience and treatment duration, requires a more nuanced approach. Therefore, we will apply the procedure developed by Manolov and Onghena (2023), which allows testing for delayed effects by calculating Pearson correlation coefficients across different phase change points for a specified response function. Comparing these coefficients enables evaluation of the timing and nature of the treatment effect.

Research question 2

Hypothesis 4: The use of DBT skills is related to less urges in maladaptive emotion regulation strategies and improved emotional well-being over time.

The analysis will be done using a mixed-effects model. This model takes into account the multilevel structure of data (observations nested within participants). The models will include use of DBT-skills measured as the extent to which the skills are applied as independent variable and maladaptive emotion regulation strategies as dependent variable. Initially, random intercept models will be fitted with random intercept effects for participants. Their fit will be compared with more complex models involving random slopes to determine if a more complex model better fits the data.

Research question 3

This is an exploratory question to examine the dynamics between maladaptive emotion regulation strategies, emotional well-being and sensory overload. Temporal network or individual dynamic time warp analysis will be performed on each case with different time lags to estimate undirected and directed networks (de Beurs et al. 2024).

Research question 4

Hypothesis 5: We expect a reliable change in emotion regulation, social behaviour, and generic psychopathology and functioning after DBT.

To answer this question, reliable change will be calculated according to the formula of Jacobson & Truax (1991).

Research question 5

This is an exploratory question to examine experiences of participants with DBT treatment. We will use a thematic analytic approach to find relevant themes (Braun & Clarke, 2006).

Data management plan

Data will be pseudonymized by use of a code during data collection. The direct identifiable information will be stored separately from the pseudonymized information in an electronic file stored on Sharepoint of GGZ Friesland, locked with a password. Access to the research data is strictly regulated. Only the research team and persons responsible for supervision or audits have access to the data after authorization by the principal investigator. The code to the

pseudonymized data is generated by an employee of RoQua. The direct identifiable information can only be linked with the pseudonymized data through this employee.

Any paper source data and study files will be stored GGZ Friesland.

Data will be stored in the safe environment of GGZ Friesland for 15 years after completion of the research.

Ethics

For ethical considerations, a nWMO statement will be requested at the medical ethical committee of the UMCG. An ethical review will be conducted as well.

Furthermore, the study will be pre-registered on ClinicalTrials.gov according to the recommendations of Johnson & Cook (2019), in order to reduce potential bias.

Planning

August – October 2026: Start pretherapy phase

October 2026 – August 2027: implementation of DBT-treatment and collecting data

September 2027 – February 2028: analysis and reporting

References

Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2009). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*, *30*(2), 217–237. https://doi.org/10.1016/j.cpr.2009.11.004

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). https://doi.org/10.1176/appi.books.9780890425596

Andover, M. S., & Morris, B. W. (2014). Expanding and clarifying the role of emotion regulation in nonsuicidal self-injury. *The Canadian Journal of Psychiatry*, *59*(11), 569-575.

Blanchard, A., Chihuri, S., DiGuiseppi, C. G., & Li, G. (2021). Risk of self-harm in children and adults with autism spectrum disorder: a systematic review and meta-analysis. *JAMA network open*, *4*(10), e2130272-e2130272.

Braun & Clarke. (2006). Using thematic analysis in psychology. *Qualitative research in Psychology*, 3, 77-101.

Camm-Crosbie, L., Bradley, L., Shaw, R., Baron-Cohen, S., & Cassidy, S. (2019). 'People like me don't get support': Autistic adults' experiences of support and treatment for mental health difficulties, self-injury and suicidality. *Autism*, *23*(6), 1431-1441.

Christensen, D. R., Dowling, N. A., Jackson, A. C., Brown, M., Russo, J., Francis, K. L., & Umemoto, A. (2013). A proof of concept for using brief dialectical behavior therapy as a treatment for problem gambling. *Behaviour Change*, *30*(2), 117-137.

Ciesinski**,** N. K., Sorgi-Wilson, K. M., Cheung, J. C., Chen, E. Y., & McCloskey, M. S. (2022). The effect of dialectical behavior therapy on anger and aggressive behavior: A systematic review with

meta-analysis. *Behaviour Research and Therapy*, *154*, 104122. https://doi.org/10.1016/j.brat.2022.104122

de Beurs, D., Giltay, E. J., Nuij, C., O'Connor, R., de Winter, R. F., Kerkhof, A., ... & Riper, H. (2024). Symptoms of a feather flock together? An exploratory secondary dynamic time warp analysis of 11 single case time series of suicidal ideation and related symptoms. *Behaviour Research and Therapy*, *178*, 104572.

De Jong, K., Nugter, M. A., Lambert, M. J., & Burlingame, G. M. (2009). Handleiding voor afname en scoring van de Outcome Questionaire OQ-45.2.

Dimeff, L. A., & Linehan, M. M. (2008). Dialectical behavior therapy for substance abusers. *Addiction science & clinical practice*, *4*(2), 39.

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of psychopathology and behavioral assessment*, *26*, 41-54.

Gross, J. J. (1998). The Emerging Field of Emotion Regulation: An Integrative Review. *Review of General Psychology*, *2*(3), 271–299. https://doi.org/10.1037/1089-2680.2.3.271

Harned, M. S., Schmidt, S. C., & Korslund, K. E. (2021). The Dialectical Behavior Therapy Adherence Checklist for Individual Therapy (DBT AC-I). https://www.dbtadherence.com/

Horwitz, E., Schoevers, R. A., & Hartman, C. A. (2013). *Psychometrische kwaliteiten en validiteit van de zelfscore- en ander-score-versies van de Vragenlijst voor Inventarisatie van Sociaal gedrag bij Volwassenen (VIS-V)*
NVVP, http://www.masterapp2.nl/nvvp_vj_2013/programma/sessie/569/3

Hu, T., Zhang, D., Wang, J., Mistry, R., Ran, G., & Wang, X. (2014). Relation between Emotion Regulation and Mental Health: A Meta-Analysis Review. *Psychological Reports*, *114*(2), 341–362. https://doi.org/10.2466/03.20.pr0.114k22w4

Huntjens, A., Van Den Bosch, L. M. C., Sizoo, B., Kerkhof, A., Smit, F., & Van Der Gaag, M. (2024). The effectiveness and safety of dialectical behavior therapy for suicidal ideation and behavior in autistic adults: a pragmatic randomized controlled trial. *Psychological Medicine*, *54*(10), 2707–2718. https://doi.org/10.1017/s0033291724000825

Huntjens, A., Van Den Bosch, L., Sizoo, B., Kerkhof, A., Smit, F., & Van Der Gaag, M. (2024b). Secondary effects of dialectical behaviour therapy on social functioning, quality of life, and autism traits in autistic adults with suicidality. *Autism*. https://doi.org/10.1177/13623613241302875

Johnson, A. H., & Cook, B. G. (2019). Preregistration in Single-Case Design research. *Exceptional Children*, *86*(1), 95–112. https://doi.org/10.1177/0014402919868529

Kothgassner, O. D., Goreis, A., Robinson, K., Huscsava, M. M., Schmahl, C., & Plener, P. L. (2021). Efficacy of dialectical behavior therapy for adolescent self-harm and suicidal ideation: a systematic review and meta-analysis. *Psychological Medicine*, *51*(7), 1057–1067. https://doi.org/10.1017/s0033291721001355

Kraiss, J. T., Klooster, P. M. T., Moskowitz, J. T., & Bohlmeijer, E. T. (2020). The relationship between emotion regulation and well-being in patients with mental disorders: A meta-analysis. *Comprehensive Psychiatry*, *102*, 152189. https://doi.org/10.1016/j.comppsych.2020.152189

Lai, M., Lombardo, M. V., & Baron-Cohen, S. (2013). Autism. *The Lancet*, *383*(9920), 896–910. https://doi.org/10.1016/s0140-6736(13)61539-1

Linehan, M. M. (2016). *De DGT-vaardigheden: handleiding voor de vaardigheidstraining dialectische gedragstherapie*. Pearson.

Manolov, R., Moeyaert, M., & Fingerhut, J. E. (2021). A Priori Justification for Effect Measures in Single-Case Experimental Designs. *Perspectives on Behavior Science*, *45*(1), 153–186. https://doi.org/10.1007/s40614-021-00282-2

McKenzie, K. C., & Gross, J. J. (2014). Nonsuicidal Self-Injury: An Emotion Regulation Perspective. *Psychopathology*, *47*(4), 207–219. https://doi.org/10.1159/000358097

Moseley, R. L., Gregory, N. J., Smith, P., Allison, C., & Baron-Cohen, S. (2020). Links between self-injury and suicidality in autism. *Molecular Autism*, *11*(1). https://doi.org/10.1186/s13229-020-0319-8

Neacsiu, A. D., Eberle, J. W., Kramer, R., Wiesmann, T., & Linehan, M. M. (2014). Dialectical behavior therapy skills for transdiagnostic emotion dysregulation: A pilot randomized controlled trial. *Behaviour Research and Therapy*, *59*, 40–51. https://doi.org/10.1016/j.brat.2014.05.005

Restoy, D., Oriol-Escudé, M., Alonzo-Castillo, T., Magán-Maganto, M., Canal-Bedia, R., Díez-Villoria, E., Gisbert-Gustemps, L., Setién-Ramos, I., Martínez-Ramírez, M., Ramos-Quiroga, J. A., & Lugo-Marín, J. (2024). Emotion regulation and emotion dysregulation in children and adolescents with Autism Spectrum Disorder: A meta-analysis of evaluation and intervention studies. *Clinical Psychology Review*, *109*, 102410. https://doi.org/10.1016/j.cpr.2024.102410

Rizvi, S. L., Steffel, L. M., & Carson-Wong, A. (2012). An overview of dialectical behavior therapy for professional psychologists. *Professional Psychology Research and Practice*, *44*(2), 73–80. https://doi.org/10.1037/a0029808

Safer, D. L., Telch, C. F., & Agras, W. S. (2001). Dialectical behavior therapy for bulimia nervosa. *American Journal of Psychiatry*, *158*(4), 632-634.

Singh, B. D., Moore, D. W., Furlonger, B. E., Anderson, A., Fall, R., & Howorth, S. (2021). Reading comprehension and autism spectrum disorder: a systematic review of interventions involving single-case experimental designs. *Review Journal of Autism and Developmental Disorders*, *8*, 3-21.

Systema, S., & van der Krieke, L. (2013). Routine outcome monitoring: A tool to improve the quality of mental health care?. *Improving mental health care: The global challenge*, 246-263.

Telch, C. F., Agras, W. S., & Linehan, M. M. (2001). Dialectical behavior therapy for binge eating disorder. *Journal of consulting and clinical psychology*, *69*(6), 1061.