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Can Gender-Affirming Hormone Therapy Be Associated with Enhanced Psychological Functioning in Trans Individuals? A Rorschach Test Study --Manuscript Draft--

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Abstract:	<p>Transgender is an umbrella term that refers to individuals whose gender identity does not align with their birth-assigned sex. Comprehensive psychological assessment is essential to evaluate psychological functioning in this population, such as stress control, cognition, affect, self-perception, and interpersonal perception. However, there is a lack of consensus on the most appropriate assessment procedures. Moreover, commonly used self-report measures may be affected by biases and limitations. This exploratory study aimed to investigate, using the Rorschach test, the psychological functioning of a sample of 28 Italian trans individuals hormone naive compared to a homogeneous group of 29 trans individuals under gender-affirming hormone therapy (GAHT) for at least 3 months. All participants were at least 18 years old, had a diagnosis of gender dysphoria according to DSM-5, were on a waiting list for gender-affirming surgery, and could provide informed consent. Individuals diagnosed with schizophrenia, other psychotic disorders, or moderate to severe intellectual disability were excluded.</p> <p>Hormone-naïve participants tended to show higher levels of coping deficits, impulsivity, and a predilection for escapist fantasies. Conversely, individuals undergoing GAHT showed higher human detail responses, more total human content, better emotional and cognitive resources for coping with daily stressors, and a significant tendency toward activity in interpersonal behaviors. At the same time, their responses suggested a form of cognitive rigidity, which may be associated with a transitional phase of psychological consolidation and defensive stabilization. Both groups showed a general tendency to avoid emotional stimuli, with particularly low affective engagement in the hormone-naïve group.</p> <p>These exploratory findings suggest that the Rorschach test may be a valuable tool for assessing psychological functioning during different phases of gender affirmation.</p>
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Response to Reviewers:	<p>Dear Nicola Carone,</p> <p>Hereby we are pleased to submit a revised version of our manuscript entitled “Can Gender-Affirming Hormone Therapy Be Associated with Enhanced Psychological Functioning in Trans Individuals? A Rorschach Test Study” to Current Psychology. We found the Reviewer's suggestions very helpful and modified the paper accordingly. We believe that the quality of our manuscript substantially improved as a result of their input.</p> <p>We answered to the reviewers' comments point-by-point, as follows:</p> <p>Comment: The manuscript "Trans Individuals' Psychological Well-being can be Improved by Hormone Therapy? A Rorschach Test Study" represents a rigorous and original contribution to the literature on transgender health and psychological assessment. The study investigates differences in psychological functioning between transgender individuals undergoing gender-affirming hormone therapy and those who are hormone-naïve, using the Rorschach Comprehensive System. The work is well-structured, methodologically sound, and written with clarity. It makes a valuable contribution by employing a performance-based tool that moves beyond the limitations of self-report measures and offers a more dynamic and multidimensional understanding of personality functioning during gender affirmation. The theoretical framework is solid and appropriately updated, and the authors display commendable sensitivity in contextualizing their findings within sociocultural and minority stress perspectives.</p> <p>My comments are intended to refine rather than substantially modify the paper, as the overall quality and coherence are high. Some minor terminological and stylistic adjustments could further improve precision and readability. For instance, the title and a few sentences might be softened to avoid implying causality—phrases such as "can be improved by hormone therapy" could be reformulated as "is associated with enhanced psychological functioning." The term "subjects" could be replaced by "participants" throughout the text, and the expression "hormone therapy" might be consistently updated to "gender-affirming hormone therapy (GAHT)," in accordance with WPATH and APA guidelines.</p> <p>Answer: Thank you for raising these important points, we rephrased the title accordingly to your suggestions as “Can Gender-Affirming Hormone Therapy Be Associated with Enhanced Psychological Functioning in Trans Individuals? A Rorschach Test Study” and applied the suggested terminological and stylistic adjustments throughout the manuscript.</p> <p>Comment: Conceptually, the manuscript could benefit from a brief elaboration on the psychodynamic meaning of bodily transformation and the integration of identity, which is particularly relevant to a Rorschach-based investigation of self and affective regulation.</p> <p>Answer: Thank you for your suggestion, it was very helpful for improving the manuscript. A psychodynamic perspective was provided as follows: “According to a psychoanalytic perspective (Saketopoulou, 2014), the ability to reflect on, understand, and mentalize one’s body reality, together with the capacity to use mature psychological defense mechanisms (e.g., self-observation) plays a key role in trans people for achieving satisfying outcomes from the gender affirming path. As underlined</p>

by Giovanardi et al. (2021), the gender affirming process itself can introduce additional challenges for psychological adjustment, as it involves substantial bodily and psychological changes. In their research on defense mechanisms in trans people awaiting GAHT, the authors found that defensive functioning correlated positively with healthy personality functioning and negatively with body dissatisfaction. Moreover, trans participants who exhibited greater defensive functioning were found to be more immature than cisgender participants. Because it accesses these levels of functioning, the Rorschach is particularly suited to detecting subtle shifts in self-structure, affect modulation, and interpersonal perception during gender-affirming path.” (page 6, lines 1-13)

Comment: The introduction could also be strengthened by situating the study within the broader Italian research context on gender identity and psychological well-being. Including more references to national studies would help readers appreciate the sociocultural specificity of the sample and the clinical frameworks informing gender-affirming care in Italy. For example, Romani et al. 2021 (*The Journal of Sexual Medicine*, 18, 1673-1687, <https://doi.org/10.1016/j.jsxm.2021.08.012>) and Mirabella et al. 2021 (*Sexuality Research and Social Policy*, 18, 1183-1195, <https://doi.org/10.1007/s13178-021-00633-3>). Integrating these and other Italian contributions would enrich the theoretical framing and underscore how national cultural narratives interact with psychological assessment practices.

Answer: We appreciated your suggestion, and more national references were provided, including Romani et al. (2021) and Mirabella et al. (2021).

Comment: From a stylistic standpoint, a few statistical and linguistic details should be verified. The reporting of p-values (e.g., "p = 0.31" instead of "p = .031") requires consistency, and the reference list should conform fully to APA 7th edition formatting, with italics for journal titles and DOIs in full URL format.

Answer: We amended the reporting of p-values and the reference list accordingly, adding DOI when available.

Comment: The abstract might also be slightly revised to better convey the non-causal, exploratory nature of the study. In the discussion, the notion of "cognitive rigidity" in the hormone-treated group could be nuanced to suggest a transitional phase of defensive stabilization rather than a pathological feature. In conclusion, this is an insightful and carefully conducted study that enriches the empirical and clinical understanding of transgender individuals' psychological functioning. The integration of projective assessment and sociocultural reflection makes it particularly valuable. After minor revisions focused on terminology, style, and a modest conceptual expansion, the manuscript will be well suited for publication. I recommend acceptance pending minor revisions.

Answer: Thank you for your valuable recommendation. We revised the abstract to clarify the exploratory nature of the study (page 1, line 10, and page 2, line 1) and in particular, the notion of "cognitive rigidity" as follows: "At the same time, their responses suggested a form of cognitive rigidity, which may be associated with a transitional phase of psychological consolidation and defensive stabilization." (page 1, lines 21-23).

TRANS PARTICIPANTS' PSYCHOLOGICAL WELL-BEING

**1 Can Gender-Affirming Hormone Therapy Be Associated with Enhanced
2 Psychological Functioning in Trans Individuals? A Rorschach Test Study**

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4 Transgender is an umbrella term that refers to individuals whose gender identity does not
5 align with their birth-assigned sex. Comprehensive psychological assessment is essential to
6 evaluate psychological functioning in this population, such as stress control, cognition, affect,
7 self-perception, and interpersonal perception. However, there is a lack of consensus on the
8 most appropriate assessment procedures. Moreover, commonly used self-report measures may
9 be affected by biases and limitations.

10 This exploratory study aimed to investigate, using the Rorschach test, the psychological
11 functioning of a sample of 28 Italian trans individuals hormone naive compared to a
12 homogeneous group of 29 trans individuals under gender-affirming hormone therapy (GAHT)
13 for at least 3 months. All participants were at least 18 years old, had a diagnosis of gender
14 dysphoria according to DSM-5, were on a waiting list for gender-affirming surgery, and could
15 provide informed consent. Individuals diagnosed with schizophrenia, other psychotic
16 disorders, or moderate to severe intellectual disability were excluded.

17 Hormone-naïve participants tended to show higher levels of coping deficits, impulsivity, and
18 a predilection for escapist fantasies. Conversely, individuals undergoing GAHT showed
19 higher human detail responses, more total human content, better emotional and cognitive
20 resources for coping with daily stressors, and a significant tendency toward activity in
21 interpersonal behaviors. At the same time, their responses suggested a form of cognitive
22 rigidity, which may be associated with a transitional phase of psychological consolidation and
23 defensive stabilization. Both groups showed a general tendency to avoid emotional stimuli,
24 with particularly low affective engagement in the hormone-naïve group.

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1 These exploratory findings suggest that the Rorschach test may be a valuable tool for
2 assessing psychological functioning during different phases of gender affirmation.

3

4 Keywords: gender-affirming path; gender dysphoria; good health and well-being;
5 psychological assessment; Rorschach; transgender

6

Can Gender-Affirming Hormone Therapy Be Associated with Enhanced Psychological Functioning in Trans Individuals? A Rorschach Test Study

According to the American Psychological Association (2015), transgender is an umbrella term that refers to individuals whose gender identity does not align with their birth assigned sex. Prevalence rates of transgender and gender nonconforming people in the general population vary widely, between 0.1% and 2% (Goodman et al., 2019). This variability largely reflects differences in data sources, sampling methods, and the definitions of gender identity applied. For example, administrative records based on legal or medical transition report lower prevalence rates (0.02–0.1%), whereas survey-based studies relying on self-identification yield higher estimates, ranging from 0.3% to 4.5% among adults, and up to 8.4% among adolescents (Coleman et al., 2022; Mezza et al., 2024; Scheim et al., 2024). Moreover, it has been hypothesized that social stigma and minority stress could contribute not only to adverse mental health outcomes in transgender populations, but also to underreporting and reduced visibility in research and clinical settings, particularly in contexts where disclosing one’s gender identity may involve significant risk (White Hughto et al., 2015; Scheim et al., 2024). These factors highlight the importance of interpreting prevalence figures considering social and methodological context.

Gender dysphoria (GD) refers to clinically significant distress that some transgender individuals experience due to the incongruence between their experienced gender and sex assigned at birth, often accompanied by a strong desire to modify primary and/or secondary sex characteristics (American Psychiatric Association, 2013; Coleman et al., 2022).

Romani et al. (2021) reported that gender diverse individuals exhibited less intense gender dysphoria but higher levels of depression and anxiety than binary transgender

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1 participants. These patterns were partly related to the gender diverse condition itself and
2 partly mediated by perceived discrimination and humiliation, highlighting the pervasive role
3 of minority stress.

4 Body dissatisfaction and mental health issues are often associated with GD (Maniaci et
5 al., 2022; Peterson et al., 2017), that can be improved through gender-affirming hormone
6 therapy (GAHT) (Kuper et al., 2020). GAHT is often the first medical intervention sought by
7 individuals with GD, as it is both accessible and effective in promoting desired physical
8 changes (Coleman et al., 2012; WPATH, 2012). Systematic reviews and meta-analyses
9 reported association of GAHT with improvements in psychological functioning, mental
10 health, and quality of life, which were observed as early as 3–6 months post-treatment
11 initiation (White Hughto et al., 2016; Rowniak et al., 2019; Wernick et al., 2019 van Leerdam
12 et al., 2023; Reisner et al., 2025).

13 In Italy, however, access to gender-affirming care is shaped by complex structural and
14 interpersonal factors. Mirabella et al. (2021) observed that transgender and nonbinary
15 individuals often experience limited support within their households, challenges in obtaining
16 gender-affirming medications and prescriptions, and reduced access to LGBT+ community
17 resources, barriers that intensified during the COVID-19 pandemic. Yet many difficulties,
18 such as long waiting lists, fragmented clinical networks, and a lack of coordination among
19 healthcare professionals, preceded the pandemic. These findings emphasize the need for
20 integrated psychological and medical pathways of care to prevent risks such as isolation or
21 informal self-medication.

22 Both the 8th version of Standards of Care for the Health of Transgender and Gender
23 Diverse People, developed by the World Professional Association for Transgender Health
24 (WPATH) (Coleman et al., 2022), and the American Psychological Association's guidelines

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(American Psychological Association, 2015), highlight the relevance of an adequate psychological assessment for trans people starting the gender-affirming path.

Nevertheless, there is no clear agreement on the specific procedures for assessing psychological functioning, as well as the impact of stigma and prejudice, in individuals with GD (Henrich, 2020). Moreover, as Shulman and colleagues (2017) highlighted, changes in diagnostic criteria of GD as well as the stigmatizing role of language in culture make many of the existing measures outdated or no longer useful. It is well known that self-report measures are influenced by some biases and limitations, such as social desirability (Furnham & Henderson, 1982). In this regard, projective assessment tools offer patients the opportunity to respond to unstructured or ambiguous stimuli, which elicit responses not influenced by self-consciousness and other concerns (Alexy, 2018), thus, reflecting their personality, cognitive style, and other psychological characteristics (American Psychological Association, n.d.). Specifically, the Rorschach test (Rorschach, 1942), according to the Exner's Comprehensive System (Exner, 1993, 1995), provides detailed information on individuals' psychological functioning including several domains, such as stress tolerance and self-control (e.g., the ability to manage emotional and situational pressure), affective functioning (e.g., how emotions are experienced and expressed), cognitive processing (e.g., clarity, efficiency, and reality-based perception), ideation (e.g., presence of unusual or problematic ideation), and interpersonal perception (e.g., how individuals perceive and relate to others) (Exner, 2003; Meyer et al., 2001).

Summarizing these domains provides a clearer understanding of the relevance of Rorschach variables, particularly in capturing the complexity of psychological functioning in individuals with GD within sociocultural contexts marked by minority stress and variable access to gender-affirming care.

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1 According to a psychoanalytic perspective (Saketopoulou, 2014), the ability to reflect on,
2 understand, and mentalize one's body reality, together with the capacity to use mature
3 psychological defense mechanisms (e.g., self-observation) plays a key role in trans people for
4 achieving satisfying outcomes from the gender affirming path. As underlined by Giovanardi
5 et al. (2021), the gender affirming process itself can introduce additional challenges for
6 psychological adjustment, as it involves substantial bodily and psychological changes. In their
7 research on defense mechanisms in trans people awaiting GAHT, the authors found that
8 defensive functioning correlated positively with healthy personality functioning and
9 negatively with body dissatisfaction. Moreover, trans participants who exhibited greater
10 defensive functioning were found to be more immature than cisgender participants. Because it
11 accesses these levels of functioning, the Rorschach is particularly suited to detecting subtle
12 shifts in self-structure, affect modulation, and interpersonal perception during gender-
13 affirming path.

14 However, literature on the use of the Rorschach to assess psychological functioning in
15 transgender individuals is limited and outdated (for a review see Michel & Mormont, 2003).
16 These studies were conducted within a historical framework that often pathologized gender
17 diversity, and their findings should be interpreted with caution. Contemporary research
18 stepped away from viewing transgender identity as inherently linked to mental illness, instead
19 the impact of social stressors, such as minority stress, stigma, and discrimination, on
20 psychological well-being has been emphasised (White Hughto, Reisner, & Pachankis, 2015;
21 Scandurra et al., 2023; Romani et al., 2021).

22 The current study supports this contemporary framework by focusing on the
23 psychological functioning of transgender individuals, rather than on psychopathology per se.
24 In line with these findings and current clinical guidelines, the present study aims to explore
25 potential differences in psychological functioning between transgender individuals with GD,

1 who have been undergoing GAHT for at least three months (THT) and those who are
2 hormone-naïve (THN), using the Rorschach test as a performance-based measure of
3 psychological functioning.

4 5 **Materials and Methods**

6 **Participants and Procedure**

7 Fifty-seven consecutive transgender individuals with a GD diagnosis [mean age = 27.4
8 years ($SD = 8.7$); mean education = 10.6 years ($SD = 2.7$); trans men = 52.6%] were recruited
9 from March 2019 to November 2022 at the Psychiatry Unit of the University Hospital "P.
10 Giaccone" in Palermo. Twenty-nine participants were receiving hormone treatment for at
11 least 3 months, while 28 individuals were not. A three-month threshold was selected based on
12 prior research suggesting this duration as the minimum period in which meaningful
13 psychological effects of GAHT are expected to emerge (Baker et al., 2021; Coleman et al.,
14 2012). Participants had been undergoing hormone therapy for periods ranging from 3 to 252
15 months.

16 In this Hospital, people waiting for gender affirming surgery are firstly assessed at the Plastic
17 Surgery Unit and then referred to the Psychiatry Unit for psychiatric and psychological
18 assessment. Two psychologists who completed an advanced training on Exner's
19 Comprehensive System administered the Rorschach test to the participants.

20 Inclusion criteria were: diagnosis of GD according to DSM-5; wait-listed for the
21 gender affirming surgery at the University Hospital "P. Giaccone", Palermo; aged 18 or older;
22 being able to understand and sign the informed consent. Patients with schizophrenia and/or
23 other psychotic disorders, or moderate to severe intellectual disability were excluded.

24 This study was approved by the ethical review board of the University Hospital "P.
25 Giaccone" in Palermo, Italy (Ref. N° 02/2019) and it was part of a larger research project

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1 including the psychological assessment of patients with GD. Informed consent was obtained
2 from all participants included in the study, and all measures were administered with respect
3 for participants' privacy.

4 **Measures**

5 *The Rorschach inkblot test*

6 The Rorschach test (Rorschach, 1921/1942) was administered and scored according to
7 the Exner's Comprehensive System (CS) guidelines (Abbate & Porcelli, 2017; Exner, 1993;
8 Exner & Erdberg, 2005), the most used Rorschach scoring system, which has shown good
9 psychometric properties (Hiller et al., 1999; Meyer et al., 2002).

10 The Rorschach test, scored using the CS, provides valuable insight across several
11 psychological domains. These include: stress tolerance and coping resources (assessing how
12 individuals manage psychological pressure and their available emotional resources); cognitive
13 processing (evaluating how a person perceives, organizes, and makes meaning of
14 information); affect regulation (measuring emotional responses and how effectively emotions
15 are managed); self-perception (gauging self-image, identity, and introspective capacity); and
16 interpersonal perception (assessing how one views and relates to others). Consistent with CS
17 guidelines, before administering the Rorschach test, a brief preliminary interview was
18 conducted to ensure that participants understood the purpose of the test and how their results
19 would be used. Any misconceptions about the test were addressed, and participants were
20 given the opportunity to ask questions. This initial interaction helped establish rapport
21 between the examiner and the participant, which can influence test administration. During the
22 Response Phase, the examiner presented the first inkblot card to the participant and asked,
23 "What might this be?" The participant was free to explore and articulate their interpretations,
24 providing one or multiple responses per card. The examiner remained mostly silent
25 throughout this phase, recording all verbalizations verbatim. Encouragement was provided

1 only in specific situations, and all participant inquiries and reactions were managed adhering
 2 to standardised administration protocols. Following the Response Phase, the Inquiry Phase
 3 was conducted to clarify and review each response provided by the participant. The goal of
 4 this phase was not to elicit new responses but to gather additional details about how the
 5 participant perceived the images. The examiner ensured that participants understood that the
 6 inquiry was a routine procedure aimed at enhancing comprehension of their responses. During
 7 this phase, the examiner read each response verbatim and asked clarifying questions to
 8 determine location (where in the inkblot the participant saw the image), determinants (what
 9 aspects of the blot – shape, colour, shading, movement – influenced their perception), content
 10 (the nature of what was perceived). The examiners exercised caution to maintain neutrality
 11 and avoid influencing participant responses. For the purpose of inter-rater agreement, 10
 12 protocols were randomly chosen and rescored independently by a psychologist.

13 **Statistical analyses**

14 Group-based differences in terms of age, level of education, and quantitative
 15 Rorschach variables were analysed with independent samples t tests. Group-based differences
 16 in terms of marital status and categorical Rorschach variables were analysed with χ^2 tests.

17 All analyses assumed an alpha risk of 5%. All statistical analyses were performed in
 18 the Statistical Package for the Social Sciences for Windows 22.0.

19 **Results**

20 The two groups did not differ significantly in age $t(55) = 1.649, p = .105$, marital
 21 status $\chi^2(2) = 1.104, p = .576$, or level of education $t(55) = -.417, p = .678$.

22 Comparing the two groups, the THT group showed significant high Hd responses $t(55)$
 23 $= 2.064, p = .044$, total human contents $t(55) = 2.077, p = .042$, WSumC $t(55) = 2.237, p =$
 24 $.029$ and EA $t(55) = 2.125, p = .038$ scores (Table 1).

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1 THT participants seemed to show more effective emotion regulation, as evidenced by
2 higher WSumC scores. Conversely, the THN group showed signs of emotional dysregulation
3 and experiencing more difficulty interacting with their environment (elevated CDI scores),
4 likely as a consequence of increased psychological distress (Exner, 2005; Bariola et al., 2015;
5 Bouman et al., 2017). Generally, individuals presenting with high CDI scores tend not to
6 experience closeness and often misinterprets others' behaviour (Abbate & Porcelli, 2017).
7 Previous studies highlighted that trans individuals who have not started the GAHT yet may
8 experience interpersonal dissatisfaction and increased vulnerability to rejection (Puckett et al.,
9 2015; Scandurra et al., 2018). These results are in line with those of Fleming and colleagues
10 (1982), who underlined an increased emotional awareness and improved environment
11 adjustment, after gender affirming surgery in 20 trans individuals. The Authors interpreted
12 these changes as a clearer understanding of both their psychological conflicts and everyday
13 life difficulties.

14 It was found that both groups were impaired in reality testing (X-). This impairment is
15 linked to specific periods and circumstances and could be due to emotional strain. In the
16 multicentric study by Porcelli et al. (2004), Italian transgender individuals presented with
17 more compromised reality testing than the Belgians, suggesting that sociocultural contexts
18 play a crucial role in shaping the psychological experience of gender transition. While GAHT
19 undoubtedly has a significant impact on psychological functioning, it is essential to consider
20 that cultural narratives around gender identity, social acceptance, and institutional support
21 may also influence the way transgender individuals experience their affirming process. In
22 Italy, despite increasing awareness and legal recognition of transgender rights, societal
23 attitudes toward gender diversity remain complex and, in some cases, stigmatising. Indeed,
24 transgender individuals in less supportive cultural environments may experience higher levels
25 of minority stress, internalised transphobia, and social discrimination, which in turn may

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1 affect cognitive and emotional functioning, including reality testing (Testa et al., 2015;
2 Scandurra et al., 2018).

3 Thus, while GAHT remains a key variable in assessing psychological differences
4 between transgender individuals, our findings should be interpreted within a broader
5 sociocultural framework. Future research should further investigate how cultural attitudes
6 toward transgender identities interact with psychological factors to shape the experience of
7 gender transition.

8 Our findings showed that the THN group is inclined to assume a passive role in interpersonal
9 relationships (a:p), exhibiting a tendency to fantasize excessively (Ma:Mp), potentially as a
10 defence mechanism in response to uncertainty and dependency during pre-treatment phases.
11 Specifically, Exner defined as “Snow White syndrome” the pervasive tendency characterised
12 mainly by the avoidance of responsibility and decision making through an extensive use of
13 fantasy in stressful situations (Exner & Erdberg, 2005). This avoidance strategy may serve as
14 a way to cope with the distress associated with their real-life dependence on others'
15 decisions—such as those made by doctors, psychologists, and surgeons—particularly during
16 the pre-treatment phase. Indeed, this mechanism seems to disappear in 70% of cases at the
17 end of their transition process (Michel & Mormont, 2002, 2004). Moreover, the THN group
18 showed extremely low values of Afr (< .44), which indicates a tendency to exert extreme
19 control over affect. Low values Afr are common in trauma victims (Abbate & Porcelli, 2017).
20 According to a recent study (Oorthuys et al., 2022), many trans individuals report relapses in,
21 or persistence of, mental health issues during the gender affirmation process, as a
22 consequence of stigma and minority stressors. Therefore, they may use a broad range of
23 coping strategies, including avoidance.

24 THT participants presented with a significant inclination to active behaviours and
25 attitudes (a:p). Although in this group low values in Afr were found, those values are higher

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1 than those found in the THN group, suggesting some improvements in affective and social
2 engagement. While our results point to meaningful differences between the two groups,
3 several limitations should be considered. The main limitation of this study is the small sample
4 size. However, recruiting large samples of transgender individuals meeting specific inclusion
5 criteria remains a challenge. All participants were recruited from a single clinical setting at the
6 University Hospital "P. Giaccone" in Palermo where they were undergoing multidisciplinary
7 assessment prior to surgery. This may introduce selection bias and limit generalizability.
8 Additionally, cultural norms and societal attitudes toward transgender individuals may have
9 influenced both participants and testers, potentially shaping responses and interpretations in
10 ways that were not explicitly controlled for. While projective techniques may overcome
11 issues of social desirability and binary-gender norming, the use of the Exner Rorschach
12 Comprehensive System (CS) also presents challenges, as its scoring method is complex and
13 requires extensive experience, even among trained practitioners. However, the psychologists
14 administering the test had over a decade of experience with the CS, and inter-rater reliability
15 was ensured by having a subset of protocols independently rescored. Finally, the cross-
16 sectional design precludes causal inferences. Although findings are consistent with the
17 broader literature supporting the psychological benefits of GAHT (White Hughto et al., 2016;
18 Rowniak et al., 2019; Wernick et al., 2019 van Leerdam et al., 2023; Reisner et al., 2025;
19 Turban et al., 2022), we cannot definitively attribute differences in psychological functioning
20 to GAHT alone. Future longitudinal studies are warranted to investigate psychological
21 changes over time and to isolate the effects of GAHT from other supportive interventions.
22 Indeed, in an ongoing study we are evaluating the level of psychological functioning of trans
23 individual pre and post GAHT through a longitudinal design, which may provide further
24 insights into the psychological impact of medical transition.

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1 In conclusion, our results suggest that GAHT may be associated with enhanced
2 psychological functioning in transgender individuals, as assessed through the Rorschach test.
3 These findings highlight the importance of gender-affirming care in aligning an individual's
4 psychological experience with their gender identity. However, interpretations must remain
5 cautious due to the study's limitations. Future research should employ more rigorous
6 methodologies, including longitudinal and cross-cultural designs, to better understand the
7 nuanced and evolving psychological experience of transgender individuals undergoing
8 medical transition. The Rorschach test may serve as a valuable tool in this process, offering a
9 non-normed approach to capturing internal psychological states across the stages of gender
10 affirmation.

1 **Author Contributions:** GM: Conceptualization, Investigation, Methodology, Formal
2 analysis, Writing - original draft, Writing - review & editing. GT: Conceptualization, Data
3 curation, Formal analysis, Writing - original draft. CLC: Methodology, Writing - original
4 draft, Writing - review & editing. TP: Methodology, Writing - original draft, Writing - review
5 & editing. EB: Investigation, Data curation, Writing - original draft, Writing - review &
6 editing. IB: Investigation, Data curation. MM: Resources, Formal analysis. CG: Investigation,
7 Resources, Methodology, Writing - original draft, Writing - review & editing. AG:
8 Investigation, Writing - original draft, Writing - review & editing. VB: Investigation, Writing
9 - original draft, Writing - review & editing. CS: Resources. SR: Resources. FT: Resources.
10 GZ: Resources. GB: Resources, Investigation. MM: Resources, Formal analysis, Writing -
11 original draft, Writing - review & editing. MC: Resources, Investigation. DLB:
12 Conceptualization, Writing - review & editing, Project administration. AC:
13 Conceptualization, Writing - review & editing, Project administration, Supervision. DQ:
14 Conceptualization, Writing - review & editing, Project administration, Supervision

15 **Funding:** This research did not receive any specific grant from funding agencies in the
16 public, commercial, or not-for-profit sectors.

17 **Data availability statement:** Due to the nature of this research, participants of this study did
18 not agree for their data to be shared publicly, so supporting data is not available.

19 20 **Declarations**

21 **Ethics approval and consent to participate:** All procedures performed in studies involving
22 human participants were in accordance with the ethical standards of the institutional and/or
23 national research committee and with the 1964 Helsinki Declaration and its later amendments
24 or comparable ethical standards. This study was approved by the ethical review board of the
25 University Hospital "P. Giaccone" in Palermo, Italy (Ref. N° 02/2019) and it was part of a
26 larger research project including the psychological assessment of patients with GD.

TRANS PARTICIPANTS' PSYCHOLOGICAL WELL-BEING

1 **Financial interests:** The authors have no relevant financial or non-financial interests to
2 disclose.

3 **Disclosure of potential conflicts of interest:** The authors report there are no competing
4 interests to declare.

5 **Informed consent:** Informed consent was obtained from all participants included in the study,
6 and all measures were administered with respect for participants' privacy.

7 **Consent for publication:** The authors affirm that human research participants provided
8 informed consent for publication.

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1 **Table 1**

2 *Comparisons between the THT and the THN groups*

Variables	Description	THT GROUP (n=29) M (SD)	THN GROUP (n=28) M (SD)	Independent <i>t</i> test
R	Responses	19.37 (6.89)	17.71 (4.16)	1.098 NS
H	Whole Human	2.51 (2.04)	1.96 (1.40)	1.186 NS
Hd	Human Detail	2.10 (2.36)	1.03 (1.40)	2.064 *
(H)	Whole Human (fictional or mythological)	.82 (.88)	.82 (.81)	.027 NS
(Hd)	Human Detail (fictional or mythological)	.34 (.48)	.28 (.65)	.387 NS
Hx	Human experience	.65 (1.39)	.42 (.87)	.730 NS
A	Whole Animal	6.65 (3.07)	6.67 (3.51)	-.027 NS
Ad	Animal Detail	1.34 (2.07)	.82 (1.12)	1.178 NS
(A)	Whole Animal (fictional or mythological)	.13 (.44)	.17 (.39)	-.368 NS
(Ad)	Animal Detail (fictional or mythological)	.10 (.30)	.07 (.26)	.428 NS
An	Anatomy	1.68 (1.64)	1.85 (1.64)	-.383 NS
Art	Art	.62 (.72)	.50 (.79)	.599 NS
Ay	Anthropolgy	.48 (.82)	.46 (.79)	.086 NS
Bl	Blood	.17 (.46)	.14 (.35)	.267 NS
Bt	Botany	1.10 (1.26)	1.17 (1.24)	-.226 NS
Cg	Clothing	1.17 (1.07)	1.21 (1.31)	-.132 NS
Cl	Clouds	.06 (.205)	.03 (.18)	.554 NS
Ex	Explosion	.03 (.18)	-	.982 NS
Fi	Fire	.13 (.44)	.28 (.46)	-1.238 NS
Fd	Food	.20 (.49)	.07 (.26)	1.292 NS
Ge	Geography	.10 (.3)	-	1.766 NS
Hh	Household	.75 (.87)	.71 (.89)	.189 NS
Id	Idiographic content	.06 (.37)	.03 (.18)	.424 NS
Ls	Landscape	.93 (1.06)	1.07 (1.43)	-.420 NS
Na	Nature	.34 (.61)	.32 (.66)	.138 NS
Sc	Science	1.20 (1.26)	1.10 (1.19)	.306 NS
Sx	Sex	1.13 (1.84)	.71 (1.60)	.923 NS
Xy	X-Ray	.17 (.38)	.28 (.71)	-.751 NS
DV	Deviant Verbalization	-	.08 (.41)	-1.065 NS
INCOM	Incongrous Combination	.32 (.60)	.60 (1.28)	-1.083 NS
DR	Deviant Responses	.24 (.91)	.32 (.66)	-.394 NS
FABCOM	Fabulized Combination	.21 (.41)	.28 (.53)	-.567 NS
ALOG	Inappropriate Logic	.17 (.60)	.17 (.39)	-.046 NS
CON	Contamination	.034 (.185)	.035 (.188)	-.025 NS
AB	Abstract Content	.62 (1.37)	.21 (.49)	1.474 NS
CP	Color Projection	.034 (.185)	.035 (.188)	-.025 NS
MOR	Morbid Content	.62 (1.29)	.21 (.41)	1.585 NS
PSV	Perseveration	.27 (.64)	.21 (.95)	.285 NS
Intellectualization Index		2.34 (2.89)	1.39 (1.74)	1.496 NS
SumY	Sum of Diffuse Shading Determinants	1.82 (1.81)	1.78 (1.87)	.086 NS
SumT	Sum of Texture Determinants	.06 (.25)	.17 (.47)	-1.087 NS
SumV	Sum of Vista Determinants	.72 (1.57)	.42 (.69)	.910 NS
SumC'	Sum of Achromatic Color Determinants	1.34 (1.47)	.89 (1.34)	1.210 NS
S	White Space Responses	1.51 (1.66)	1.32 (1.41)	.478 NS
Blends		2.93 (3.62)	2.07 (2.12)	1.087 NS
Ego Index	Egocentricity Index	.40 (.19)	.37 (.26)	-.455 NS
SumH	Sum of all Human Contents	4.65 (3.51)	3.10 (1.81)	2.077 NS
PER	Personalized Answers	0.96 (1.11)	.60 (.99)	1.278 NS
Isolation Index		.16 (.13)	.16 (.12)	-.196 NS
ROD	Rorschach Oral Dependency Scale	.12 (.14)	.09 (.11)	.897 NS
WSum6	Weighted Sum of the first 6 Special Scores	4.17 (5.35)	4.96 (7.43)	-.463 NS
FM	Animal Movement Responses	1.25 (1.49)	1.06 (1.16)	.547 NS
m	Inanimate Movement Reponses	.22 (.66)	.36 (.49)	-.902 NS
X-	Distorted Form	25.82 (13.35)	28.17 (12.67)	-.681 NS
FQnone	Form Quality - none	.31 (1.00)	.17 (.47)	.630 NS
Pop	Popular Responses	3.41 (1.80)	3.53 (1.66)	-.265 NS
FQ+	Form Quality - superior-overelaborated	-	-	-

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WDA	W+D Form Appropriateness	78.62 (15.81)	79.07 (16.37)	-.106 NS
Zf	Z Frequency	8.89 (4.14)	8.78 (4.29)	.099 NS
Zd	Processing Efficacy	-.06 (3.82)	.55 (3.78)	-.617 NS
XA	Extended Form Appropriateness	73.20 (13.84)	70.96 (13.13)	.627 NS
Adj.es	Adjusted Experience Stimulation	4.82 (3.28)	4.32 (3.15)	.593 NS
eb	Experience Base	2.44 (2.08)	2.42 (1.97)	.037 NS
Adj.D	Adjusted D Score	.41 (1.57)	-.14 (.52)	1.782 NS
D	Stress Tolerance Score	.00 (1.71)	-.46 (.88)	1.281 NS
EA	Experience Actual	5.79 (4.38)	3.78 (2.44)	2.125 *
WSumC	Weighted Sum of Colors	2.58 (2.40)	1.42 (1.33)	2.237 *
Total human contents		4.65 (3.51)	3.1 (1.81)	2.077 *

Note. NS = Non-significant; * $p < .05$; ** $p < .01$; *** $p < .005$; **** $p < .001$.

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1 **Table 2**

2 *Comparisons between the THT and the THN groups*

Factor	Description	THT group (n=29) Frequency (%)	THN group (n=28) Frequency (%)	Chi Square Test
Lambda Expected value Hyper-engagement Avoidance	Tendency to simplify complex stimuli	16 (55.2%) 4 (13.8%) 9 (31%)	13 (46.4%) 3 (10.7%) 12 (42.9%)	.864 NS
DEPI Positive	Depression Index	8 (27.6%)	6 (21.4%)	.292 NS
CDI Positive	Coping Deficit Index	8 (28.6%)	20 (71.4%)	10.956 ****
HVI Positive	Hyper-Vigilance Index	4 (13.8%)	1 (3.6%)	1.86 NS
PTI Positive	Perceptual Thinking Index	5 (17.2%)	4 (14.3%)	.094 NS
S-CON Positive	Suicidal- Constellation	1 (3.4%)	-	.983 NS
OBS Positive	Obsessive Style Index	-	-	-
EA AdjD Adequate capacity for control Overestimate capacity Underestimate capacity Severe limitations	Stress Control	7 (41.2%) 4 (23.5%) 3 (17.6%) 3 (17.6%)	3 (25%) - 3 (25%) 6 (50%)	5.914 NS
EB Introversive pervasive Introversive Extratensive pervasive Extratensive Ambitent	Erlebnistypus, Experience Type	3 (15%) 5 (25%) 2 (10%) 2 (10%) 8 (40%)	2 (11.1%) 5 (27.8%) 1 (5.6%) - 10 (55.6%)	2.658 NS
W:M Adequate ambitions Unrealistic ambitions Low ambitions	Aspirational Ratio	4 (21.1%) 7 (36.8%) 8 (42.1%)	5 (26.3%) 10 (52.6%) 4 (21.1%)	1.974 NS
DQ+/-v Expected value High quality Low quality Impulsivity	Synthesis activity	1 (3.6%) 13 (46.4%) 14 (50%) -	6 (24%) 7 (28%) 8 (32%) 4 (16%)	10.873 *
XA% WDA% XA%=.70-.80, WDA%≥XA% XA%=.8, WDA%≥XA%	Cognitive Mediation	11 (45.8%) 8 (33.3%)	8 (38.1%) 5 (23.8%)	2.310 NS

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1	XA%>.8, WDA%<XA%		-	1 (4.8%)	
2	XA%<.70, WDA%<.70		5 (20.8%)	7 (33.3%)	
3	WSum6	Ideation			
4	Expected values		7 (50%)	10 (58.8%)	
5	Mild limitations in ideation		3 (21.4%)	3 (17.6%)	.780 NS
6	Serious impairment in ideation		3 (21.4%)	2 (11.8%)	
7	Severe impairment in ideation		1 (7.1%)	2 (11.8%)	
8					
9	FM/M	Unmet need states			
10	FM=3-5 / m=0-2 / FM>m		12 (70.6%)	12 (66.7%)	.062 NS
11	FM<2 / m>FM		5 (29.4%)	6 (33.3%)	
12					
13	Ma:Mp				
14	Ma>Mp	Tendency to	14 (77.8%)	-	19.358 ****
15	Mp>Ma+1	engage in fantasy	4 (22.2%)	14 (100%)	
16					
17	a:p (ideation cluster)				
18	Cognitive flexibility	Cognitive	2 (11.1%)	6 (46.2%)	4.841 *
19	Lack of cognitive flexibility	flexibility	16 (88.9%)	7 (53.8%)	
20					
21	FC:CF+C				
22	Pure C=0, FC>CF+C	Capacity to	22 (78.6%)	18 (75%)	
23	Pure C>0, FC>CF+C	modulate	1 (3.6%)	1 (4.2%)	1.211 NS
24	Pure C=0-1, CF+C>FC	emotional	4 (14.3%)	5 (20.8%)	
25	Pure C>1, CF+C>FC	expression	1 (3.6%)	-	
26					
27	Afr				
28	Afr = average range	Affective Ratio	9 (37.5%)	9 (34.6%)	
29	Afr > average range		2 (8.3%)	2 (7.7%)	8.843 *
30	Afr < average range		6 (25%)	-	
31	Afr < 0.44		7 (29.2%)	15 (57.7%)	
32					
33	SumC':WSumC	Constriction			
34	SumC'<WSumC	Ratio	22 (81.5%)	19 (82.6%)	
35	SumC'>WSumC		5 (18.5%)	4 (17.4%)	.011 NS
36					
37	Fr+rF	Self-Perception,			
38	=0	narcissistic	17 (58.6%)	19 (67.9%)	
39	>0	features of	12 (41.4%)	9 (32.1%)	.522 NS
40		personality			
41	MOR Fr+rF				
42	MOR=0-1 Fr+ rF =0	Negative Self-	15 (78.9%)	19 (100%)	
43	MOR > 1 Fr+ rF = 0	Perception	2 (10.5%)	-	4.471 NS
44	MOR > 1 Fr+ rF > 0		2 (10.5%)	-	
45					
46					
47	Ego Index Fr+rF	Egocentricity	3 (10.3%)	7 (25%)	
48	EI=.33-.45, Fr+rF=0	tendency and self-	3 (10.3%)	2 (7.1%)	
49	EI=.33-.45, Fr+rF>0	esteem	2 (6.9%)	1 (3.6%)	
50	EI>.45, Fr+rF=0		8 (27.6%)	5 (17.9%)	3.186 NS
51	EI>.45, Fr+rF>0		12 (41.4%)	11 (39.3%)	
52	EI<.33, Fr+rF=0		1 (3.4%)	2 (7.1%)	
53	EI<.33, Fr+rF>0				
54					
55	SumH PureH	Interpersonal	11 (45.8%)	9 (33.3%)	
56	Expected values	interest	3 (12.5%)	1 (3.7%)	2.848 NS
57	Tendency to misread people		10 (41.7%)	17 (63%)	
58	Low interest in people				

TRANS PARTICIPANTS' PSYCHOLOGICAL WELL-BEING

1	An+Xy	Body or Self-	13 (44.8%)		
2	0-1	Image concerns	16 (55.2%)	13 (46.4%)	.015 NS
3	>1			15 (53.6%)	
4	SumV FD	Tendency to Self-			
5	SumV=0, FD=0-1	Reflection,	13 (48.1%)	12 (44.4%)	
6	SumV=0, FD=0	introspection	5 (18.5%)	6 (22.2%)	.131 NS
7	SumV>0		9 (33.3%)	9 (33.3%)	
8					
9	SumT (interpersonal perception	Intimacy needs			
10	cluster)				
11	0-1		29 (100%)	27 (96.4%)	1.054 NS
12	>1		-	1 (3.6%)	
13					
14	a:p (interpersonal perception	Interpersonal			
15	cluster)	behaviors			
16	a>p		16 (84.2%)	5 (33.3%)	9.188 ***
17	p≥a+1		3 (15.8%)	10 (66.7%)	
18					
19	GHR:PHR	Good to poor			
20	GHR>PHR	human	8 (27.6%)	6 (21.4%)	
21	GHR<PHR	representation	14 (48.3%)	7 (25%)	5.512 NS
22	N.A.		7 (24.1%)	15 (53.6%)	
23					
24					
25	COP AG	Relational style			
26	COP=1, AG= 1		1 (4.8%)	-	
27	COP=0, AG=0		19 (90.5%)	23 (100%)	2.295 NS
28	COP>1, AG=0-1		1 (4.8%)	-	
29					
30	Ego Impairment Index	Psychological			
31	<+.2	impairment and	14 (50%)	18 (64.3%)	
32	+.2/+.6	thought	4 (14.3%)	3 (10.7%)	
33	+.6/+.8	disturbance	3 (10.7%)	1 (3.6%)	1.754 NS
34	+.8/+1.3		2 (7.1%)	2 (7.1%)	
35	>+1.3		5 (17.9%)	4 (14.3%)	
36					
37					
38	Extended Aggression Scores				
39	AgC=0-2	Aggressive	20 (80%)	18 (66.7%)	1.173 NS
40	AgC>2	Contents	5 (20%)	9 (33.3%)	
41	AgPast=0-1	Aggressive – Past	23 (92%)	27 (100%)	2.246 NS
42	AgPast>1		2 (8%)	-	
43	AgPot=0	Aggressive –	24 (96%)	23 (85.2%)	
44	AgPot>0	Potential	1 (4%)	4 (14.8%)	1.747 NS
45	SM=0	Sadomasochism	25 (100%)	27 (100%)	
46	SM>0		-	-	-

1

2 *Note.* NS = Non-significant; * $p < .05$; ** $p < .01$; *** $p < .005$; **** $p < .001$.

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Can Gender-Affirming Hormone Therapy Be Associated with Enhanced Psychological Functioning in Trans Individuals? A Rorschach Test Study

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Dear Nicola Carone,

Hereby we are pleased to submit a revised version of our manuscript entitled “Can Gender-Affirming Hormone Therapy Be Associated with Enhanced Psychological Functioning in Trans Individuals? A Rorschach Test Study” to Current Psychology. We found the Reviewer's suggestions very helpful and modified the paper accordingly. We believe that the quality of our manuscript substantially improved as a result of their input.

We answered to the reviewers' comments point-by-point, as follows:

Comment: The manuscript "Trans Individuals' Psychological Well-being can be Improved by Hormone Therapy? A Rorschach Test Study" represents a rigorous and original contribution to the literature on transgender health and psychological assessment. The study investigates differences in psychological functioning between transgender individuals undergoing gender-affirming hormone therapy and those who are hormone-naïve, using the Rorschach Comprehensive System. The work is well-structured, methodologically sound, and written with clarity. It makes a valuable contribution by employing a performance-based tool that moves beyond the limitations of self-report measures and offers a more dynamic and multidimensional understanding of personality functioning during gender affirmation. The theoretical framework is solid and appropriately updated, and the authors display commendable sensitivity in contextualizing their findings within sociocultural and minority stress perspectives. My comments are intended to refine rather than substantially modify the paper, as the overall quality and coherence are high. Some minor terminological and stylistic adjustments could further improve precision and readability. For instance, the title and a few sentences might be softened to avoid implying causality—phrases such as "can be improved by hormone therapy" could be reformulated as "is associated with enhanced psychological functioning." The term "subjects" could be replaced by "participants" throughout the text, and the expression "hormone therapy" might be consistently updated to "gender-affirming hormone therapy (GAHT)," in accordance with WPATH and APA guidelines.

Answer: Thank you for raising these important points, we rephrased the title accordingly to your suggestions as “Can Gender-Affirming Hormone Therapy Be Associated with Enhanced Psychological Functioning in Trans Individuals? A Rorschach Test Study” and applied the suggested terminological and stylistic adjustments throughout the manuscript.

Comment: Conceptually, the manuscript could benefit from a brief elaboration on the psychodynamic meaning of bodily transformation and the integration of identity, which is particularly relevant to a Rorschach-based investigation of self and affective regulation.

Answer: Thank you for your suggestion, it was very helpful for improving the manuscript. A psychodynamic perspective was provided as follows: *“According to a psychoanalytic perspective (Saketopoulou, 2014), the ability to reflect on, understand, and mentalize one’s body reality, together with the capacity to use mature psychological defense mechanisms (e.g., self-observation) plays a key role in trans people for achieving satisfying outcomes from the gender affirming path. As underlined by Giovanardi et al. (2021), the gender affirming process*

itself can introduce additional challenges for psychological adjustment, as it involves substantial bodily and psychological changes. In their research on defense mechanisms in trans people awaiting GAHT, the authors found that defensive functioning correlated positively with healthy personality functioning and negatively with body dissatisfaction. Moreover, trans participants who exhibited greater defensive functioning were found to be more immature than cisgender participants. Because it accesses these levels of functioning, the Rorschach is particularly suited to detecting subtle shifts in self-structure, affect modulation, and interpersonal perception during gender-affirming path." (page 6, lines 1-13)

Comment: The introduction could also be strengthened by situating the study within the broader Italian research context on gender identity and psychological well-being. Including more references to national studies would help readers appreciate the sociocultural specificity of the sample and the clinical frameworks informing gender-affirming care in Italy. For example, Romani et al. 2021 (The Journal of Sexual Medicine, 18, 1673-1687, <https://doi.org/10.1016/j.jsxm.2021.08.012>) and Mirabella et al. 2021 (Sexuality Research and Social Policy, 18, 1183-1195, <https://doi.org/10.1007/s13178-021-00633-3>). Integrating these and other Italian contributions would enrich the theoretical framing and underscore how national cultural narratives interact with psychological assessment practices.

Answer: We appreciated your suggestion, and more national references were provided, including Romani et al. (2021) and Mirabella et al. (2021).

Comment: From a stylistic standpoint, a few statistical and linguistic details should be verified. The reporting of p-values (e.g., "p = 0.31" instead of "p = .031") requires consistency, and the reference list should conform fully to APA 7th edition formatting, with italics for journal titles and DOIs in full URL format.

Answer: We amended the reporting of p-values and the reference list accordingly, adding DOI when available.

Comment: The abstract might also be slightly revised to better convey the non-causal, exploratory nature of the study. In the discussion, the notion of "cognitive rigidity" in the hormone-treated group could be nuanced to suggest a transitional phase of defensive stabilization rather than a pathological feature. In conclusion, this is an insightful and carefully conducted study that enriches the empirical and clinical understanding of transgender individuals' psychological functioning. The integration of projective assessment and sociocultural reflection makes it particularly valuable. After minor revisions focused on terminology, style, and a modest conceptual expansion, the manuscript will be well suited for publication. I recommend acceptance pending minor revisions.

Answer: Thank you for your valuable recommendation. We revised the abstract to clarify the exploratory nature of the study (page 1, line 10, and page 2, line 1) and in particular, the notion of "cognitive rigidity" as follows: *"At the same time, their responses suggested a form of cognitive rigidity, which may be associated with a transitional phase of psychological consolidation and defensive stabilization."* (page 1, lines 21-23).