



Role-play regulates positive emotions and prosocial attitudes

Authors

Alexandru I. Berceanu*¹, Claudiu Papasteri^{1,2}, Alexandra Sofonea¹, Romina Boldasu¹, Diana Nita¹, Cătălina Poalelungi^{1,3}, Ioana Carcea^{1,4}

*Corresponding author: Alexandru I. Berceanu, zberceanu@yahoo.com; berceanu@cinetic.unatc.ro, address Tudor Arghezi 3B Cinetic Building 020941

1 National University of Theatre and Film IL Caragiale, Bucharest, Romania, CINETic Centre,

2 Faculty of Psychology and Educational Sciences, Department of Psychology, University of Bucharest, Bucharest, Romania,

3 Faculty of Biology, University of Bucharest, Bucharest, Romania,

4 Brain Health Institute, Department of Pharmacology, Physiology and Neuroscience, New Jersey Medical School, Rutgers, The State University of New Jersey, Newark, NJ, United States

ABSTRACT

Role play is one of the core creative processes in theatrical performance. Play leads to positive emotions in both children and adults. Role-play, a distinctive type of play is used in several types of therapeutic interventions to increase social competence as well as for other benefits. The highly individualized use of role-play in psychotherapy, drama therapy and psychodrama is effective but not generalizable. In the present study we developed a standardized controlled procedure to promote role-play in 38 participants, and we monitored its impact on affect, anxiety, prosocial attitudes, and salivary oxytocin dynamics. Compared to the control condition where participants participated as selves, role-play significantly increased perceived levels of positive affect and prosocial attitudes and decreased self-reported levels of anxiety. Basal salivary oxytocin levels predicted gains in positive affect following the role-play procedure. Our study points to standardized role-play as a mean to reduce anxiety, and to increase sociability and positive affect. Possible mechanisms of how role-play induces the observed changes in affect and attitudes are discussed.

Key words: role-play, oxytocin, positive affect, anxiety, emotion regulation

INTRODUCTION

Theatre is a particular form of art that represents actions through embodied actions based on elements of play (Caillois, 2001). While play is almost ubiquitous in animal phylogeny, pretend play and role-play seem highly specific to humans, and are based on human capacity of perspective taking, the ability to identify and understand an alternative point of view (Wah, 2018). Role-play is considered a specific type of pretend play with participants engaging in a set of verbal and/or non-verbal actions based on an “as if” rapport with a set of instructions considered to describe characteristics of another self (Yardley-Matwiejczuk, 1997). To create roles and immerse in ‘character behavior’ children, adults and professional actors use several psychological processes, primarily perspective taking, theory of mind, imagination, empathy, verbal and memory skills; understating those processes is of interest both for professionals and researchers (Bentley, 1962; Brown, 2017; Connolly & Ralley, 2007; Goldstein, 2009; Lola, 2010; Schmitt, 1986; Shirley, 2018; Stanislavski, 2003).

Complex psychological processes involved in theatre are driven by embodying representations of others and performing fictional actions. While complexity brings the beauty of theatre, it also accounts for limited understanding of what actual processes contribute to the beneficial effects observed after role play based interventions (Brown et al., 2019; Corsini, 2010; Daisy & Saoirse, 2019; Feniger-Schaal & Orkibi, 2020). In our study we designed a controlled procedure for inducing role-play suitable to participants without prior training in acting, with the objective of observing how role-play affects emotional states as well as prosocial attitudes. In this procedure the ‘Role-play’ condition encompasses both acting as a fictional person and dramatic action and is compared to the condition where a dramatic action is performed without impersonation, as ‘Self’.

Role-play is widely used in psychology, connected with psychotherapeutic process, as well as assessment and research (Landy et al., 2003; Yardley-Matwiejczuk, 1997). Based on Goffman's theory that people adopt roles in their social life to maximize opportunities, it is proposed that spontaneity, a key aspect of psychological health, can be trained through role-play, diminishing cognitive dissonance, developing flexibility in day-to-day life (Goffman, 1959; Landy, 2009; Moreno, 1946).

Role-play is widely used in psychotherapy, mainly in creative therapies or child-oriented therapies, but also in cognitive behavioral therapy (Butler et al., 2006; Clarck & Beck, 2010; Dagnan et al., 2018; Dagnan & Jahoda, 2006; Morgan & Banerjee, 2006), interpersonal therapy, (Stangier et al., 2011; Weissman et al., 2000), and many others (Corsini, 2010; Sterling, 1993; Wedding & Corsini, 2013). The use of role-play for educational purposes shows higher gains in knowledge retention (Acharya et al., 2019; Henderson & King, 2021; Kashiha & Chan, 2013; Toomey et al., 2019), attitude change (Arifah et al., 2018; Ingersoll, 1973; Janis & Mann, 1965; Karatay & Baş, 2017; Mann, 1967), and social skills growth (Freeman et al., 2003; Gresham et al., 2004; Havens, 2019; Hersen et al., 1980; Munro et al., 2019; Tilley & Palmer, 2013).

Role-play and theatre-based interventions are also widely used in psychiatric conditions like autism, schizophrenia or ADD, with consistent benefits in social skills, verbalization, interpersonal behavior and building self-esteem (Corbett, Qualls, et al., 2014; Corbett, Swain, et al., 2014; Kingsep et al., 2003; Wannenburg & van Niekerk, 2019; Wilkes-Gillan et al., 2016; Yotis, 2006).

The practice of role-play in research is widely critiqued for the lack of possibility in generalizing data obtained in the artificial set up of experiments. Furthermore, experiments involving role-play may lack consistency in its induction method, or the induction method may

manipulate the context in favor of the pursued hypothesis. Still, role-play is considered a valuable approach if used in a controlled and yet opens process (Yardley-Matwiejczuk, 1997).

Although perspective taking and theory of mind are widely acknowledged to underlie role-play, and, despite the widespread use of role-play in psychology, almost no studies were done to link psychological processes involved in role-play, or their functional basis with their biochemical substrate and emotional and cognitive outcomes (Brown et al., 2019).

Perspective taking and role-play outcomes seem to also depend on the way they are induced or performed (Berceanu et al., 2020; Herrera et al., 2018; Kipper & Har-Even, 1984). Still, except for acting methods, there are no sets of established induction methods for specific role-play outcomes, so using role-play is generally based on the practical experience of the researcher, therapist, or educator. Aiming for a fully standardized procedure, we have chosen a simple technique of inducing role-play widely used in university acting programs: being interviewed while answering questions from the perspective of a known fictional character. For providing a standardized induction method a scripted first-person account of the character was recorded. Role-play induction through answering questions from the perspective of a fictional character was previously used in research (Brown et al., 2019).

Oxytocin received a lot of attention for its involvement in social interaction, especially due to its role in bond formation (Bartz et al., 2011). Oxytocin intranasal administration is considered as intervention treatment for autism (Huang et al., 2021; Quintana et al., 2018) and anorexia nervosa (Leppanen et al., 2017; Russell et al., 2018). Oxytocin appears to be involved both in positive and negative social interactions as previously shown (Papasteri et al., 2020) as well as in antisocial behaviors such as aggression or envy (Shamay-Tsoory & Abu-Akel, 2016).

Monitoring oxytocin levels in saliva has a lot of advantages, especially in experiments targeting stress or anxiety levels, and observed levels are affected by different types of human interactions and activities such as physical exercise, sexual stimulation, induced social stress, touching, mother-infant and father infant interaction, etc. (Jurek & Neumann, 2018).

In the present study we designed a generalizable and controlled role-play induction procedure. The procedure was used on a group without prior acting training to test our hypothesis that role-play will induce stronger positive affect, decreased anxiety, and stronger prosocial attitudes by involving the oxytocin system when compared to a similar dramatic action without the role play-component.

METHODS AND DESIGN

Participants

42 healthy adults aged between 19 and 64 ($M=39.9$, $SD=10.1$) participated in the study. Among these, 34 were women (81%). Some of the participants dropped out after completing the first condition they were randomized to. Consequently, 38 participants completed the 'Role-play' condition and 37 completed the 'Self' condition.

Ethics

The study was presented to the participants prior to enrolment in the study. All participants were enrolled in the study after they were presented the study and signing the informed consent. The study was participant to approval of the Ethic Comity of the University and was approved.

Dramatic Action

Based on the work of Stanislavsky, dramatic action was proposed as a basic unit of theater, defined as the effort that one makes to change the state of another needed in practice to set a goal to a performed theatrical action (Liron et al., 2018). Dramatic action, as formulated by the director's indications for actors or improvisation prompts, is based on unequivocal active verbs which are concrete but also have a sense of generality like: "sooth", "comfort", "hurt", "encourage" or "cheer". High inter-participant agreement on their graphical representation, meaning and emotional valence (Liron et al., 2018) recommends the use of dramatic actions in an experimental environment for inducing role-play within a controlled design. In our experiment we used the same dramatic action in both experimental conditions: "A person will enter the room, after meeting you, she will go through a surgical procedure, try to comfort her with your answers".

Design

Our study employed a randomized crossover design. The experiment followed a succession of three days: day one – training, day two – dramatic action in either the 'Role-play' or 'Self in the Situation' ('Self') condition; day three – dramatic action in the remaining condition. Participants were randomly assigned to perform first either the 'Role-play' or the 'Self' condition. Training and questionnaires were applied by an "experimenter" and interviews were conducted by a different person, the "interviewer". The experiment was conducted by three different female experimenters and three different female interviewers.

Script and recording

A script was devised to induce role-play. The script followed, in third person narration, the story of an “unlucky” person, focusing on several funny but also challenging events. Main elements of the story were inspired by different clown characters and typologies like Pierrot, Chaplin’s The Tramp or Chekov’s Epikhodov. The story described the character chased by bad luck, but also always protected by his trust and sociability. All bad things would turn out for the best and turn into a good experience for ‘her/him’. The script was recorded by a professional actress as she makes reference to the experience of a friend in the third person. Her accounts of this friend were recorded both in a she and he version to match the gender of the participant listening to them. The duration of the recording was 4 minutes 45 seconds for the ‘him’ reference and 4.35 for the ‘her’ with no other changes in the script beside gender pronouns.

Day one - Training

In the training session participants were asked to respond to a set of 6 predetermined training questions from their own perspective. After listening to the recorded narration, participants were instructed to give the character name. The experimenter would ask the same set of questions and the participant answered from the perspective of the fictional character. For the ‘Role-play’ condition, the instructions would state to choose a hat for the character and to answer all questions from the perspective of the character while wearing the hat. The experimenter would address the participant with the name attributed to the character. If the participant did not reflect the task in his answers, the experimenter would provide up to three answering examples for role-play condition complying reflecting the point of view of the character.

Some of the questions had answers directly relating to the narrated events but could be answered also from any point of view (for instance, “*What is your favorite pet?*” or “*You hear a*

kitten crying in the dark; what would you do?”). Participants were instructed to provide detailed answers in both the ‘Self’ and the ‘Role-play’ conditions and to attain the dramatic action objective of calming the interviewer before his surgery.

Day two and three – Intervention or control

After finishing the training session, participants would be randomly assigned to perform in the first day the ‘Self’ or the ‘Role-play’ condition. All instructions were recorded and played on the loudspeaker) in both conditions each day.

Sessions were performed with a minimum of two days between training and first experimental session and no longer than one week between the two experimental sessions. The experimenter would assist the participant in filling questionnaires before and after sessions. After 15 minutes from arriving to the lab a saliva sample was collected. Instructions of the assigned condition would be played on loudspeaker while the participant was alone in the experimental room, and then the interviewer entered to join the participant. During the ‘Role-play’ condition, the interviewer addressed the participant using the name previously chosen for the fictional character. During the ‘Self’ condition the interviewer addressed the participant by their real first name. The interviewer asked the same set of 30 questions in both conditions, and then left the room. Then the participant was asked again to fill in the questionnaires as before, and after 15 minutes another saliva probe was collected. The experimenter reapplied the questionnaires as before.

Instructions and interview questions

Each day the instructions were played on a loudspeaker from an adjacent space of the experimental room. The recordings would state the main indications of the training: General

Instruction - “The objective of the task is not artistic”; ES - “respond to the questions from your perspective”; RP – “Listen carefully to the following story[...] Take the hat you think would suit the person whose story you heard. Place the hat on your head. While you have the hat on your head answer from his you will know how he/she thinks, and fells answer from this perspective”; Dramatic Action - “A person will enter the room, after meeting you he will go through a surgical procedure, try to comfort him with your answers”.

All participants were video monitored and adherence to protocol was assessed by experimenters. For the Role-play condition, the instructor would come in after the participant placed the hat on and ask the interview questions from a list of 30 questions. The same questions were used both in Self and Role-play conditions. The instructor would interact based just on the questions without displaying any signs which might relate to a future surgery. After the set of finalizing the interview, the instructor would leave the room and the experimenter would enter and apply the set of daily post-test questionnaires. When addressing the questions during ‘Self’ condition instructor would use the participant’s name, during the role-play the instructor would use the name assigned by each participant to the fictional character.

Instruments

Adult Prosociality Scale (APS) is a 16-item questionnaire with responses on a five-points Likert scale developed to assess the global propensity to behave prosaically from late adolescence to adulthood (Caprara et al., 2005). The Adult Prosociality Scale was designed as a measure to assess individual differences in general adults’ tendencies to act in favor of others and has been proved useful in several studies in different countries (Caprara et al., 2005). The scale has been validated in Italy with classical test theory and the item response theory approach

showing adequate psychometric qualities and construct validity (Kanacri et al., 2021). APS has been correlated with agreeableness and emotional and empathic self-efficacy (Alessandri et al., 2009).

The State-Trait Anxiety Inventory (STAI-Y) is a commonly used measure of trait and state anxiety used in clinical settings to diagnose anxiety and to distinguish it from depressive syndromes (C. D. Spielberger, 1989). It has 20 items for assessing trait anxiety and 20 for state anxiety (C. D. Spielberger, 1989). State anxiety items include items like: “I am tense; I am worried” and “I feel calm; I feel secure.”, higher scores indicate greater anxiety. Internal consistency coefficients for the scale have ranged from .86 to .95; test-retest reliability coefficients have ranged from .65 to .75 over a 2-month interval (C. Spielberger et al., 1983). Due to later inclusion of the instrument in the study, only 28 participants completed the STAI-Y.

The Positive and Negative Affect Schedule (PANAS) is a scale widely used to measure mood or emotion (Watson et al., 1988). It is comprised of 20 items, with 10 items measuring positive affect (e.g., excited, inspired) and 10 items measuring negative affect (e.g., upset, afraid). Each item is rated on a five-point Likert Scale, ranging from 1 = *Very Slightly or Not at all* to 5 = *Extremely*, to measure the extent to which the affect has been experienced in a specified time frame. The PANAS was designed to measure affect in various contexts such as at the present moment, the past day or interval ranging to year, or in general (on average). The scale can be used to measure state affect, dispositional or trait affect, emotional fluctuations throughout a specific period, or emotional responses (Tran, 2013).

Oxytocin Assay

Saliva samples were collected two times for OXT assay as previously reported through Radio-Immuno-Assay, RIA, (Landgraf et al., 1982; Papasteri et al., 2020; Tomescu et al., 2022). Participants provided saliva samples after 15 min from arriving in the lab without social contact and 15 min after the experimental conditions as assisted by a qualified medical nurse. The saliva samples were collected in special designed tubes (Salivette, Sarstedt). The participants were instructed to move the synthetic swab inside the salivette slowly in their mouth until it was saturated with saliva. The swab was then placed back into the specific tube and centrifuged at 1,000g, at 4° C, for 2 min and the samples were aliquoted in 1,5 ml Eppendorf vials and stored at 80° C prior to analysis. OXT was measured by radioimmunoassay (RIA) at RIAgnosis, Munich, Germany, while total proteins were measured at National Institute of Endocrinology “C. I. Parhon,” Bucharest, Romania. Salivary total protein was used to normalize the concentration of salivary OXT levels, since its concentration can vary significantly with saliva viscosity.

RESULTS

Effects of role-play on affect

Positive affect increased significantly after the ‘Role-play’ condition (**Figure 1A**, $t(36) = 2.62$, $p = 0.013$, $g = 0.42$, 95%CI = [0.09, 0.76], $\text{power}_{\alpha=0.05} = 0.704$). Participants after the ‘Self’ condition had only a non-significant marginal increase in positive affect (**Figure 1B**, $t(35) = 1.83$, $p = 0.075$, $g = 0.30$, 95%CI = [-0.03, 0.63], $\text{power}_{\alpha=0.05} = 0.414$). The positive trend in the two conditions was captured by a significant main effect of Time in repeated measures ANOVA ($F(1,31) = 9.474$, $p = 0.004$, $\eta^2_g = 0.020$, $\text{power}_{\alpha=0.05} = 0.878$). However, due to very low power,

the Time×Condition interaction failed to reach significance ($F(1,31) = 0.037$, $p = 0.848$, $\eta^2_g = 0.001$, $\text{power}_{\alpha=0.05} = 0.054$).

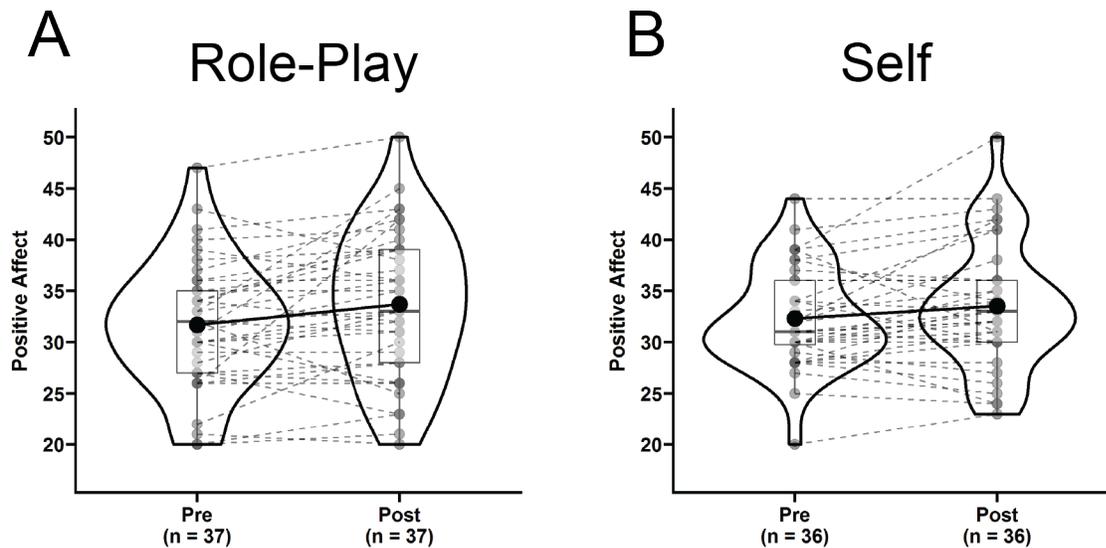


Figure 1: A. Role-play improves positive affect. B. Participating in dramatic action as self does not change positive affect.

Negative affect decreased significantly both after the ‘Role-play’ (**Figure 2A**, $t(36) = -4.18$, $p < 0.001$, $g = -0.67$, $95\%CI = [-1.03, -0.32]$, $\text{power}_{\alpha=0.05} = 0.978$) and after the ‘Self’ conditions (**Figure 2B**, $t(35) = -3.05$, $p = 0.004$, $g = -0.50$, $95\%CI = [-0.85, -0.16]$, $\text{power}_{\alpha=0.05} = 0.826$), with a larger effect sized for ‘Role-play’. The decreasing trend in the two conditions was revealed by a significant main effect of Time in repeated measures ANOVA ($F(1,31) = 17.395$, $p < 0.001$, $\eta^2_g = 0.036$, $\text{power}_{\alpha=0.05} = 0.988$). But again, the Time×Condition interaction failed to reach significance ($F(1,31) = 0.260$, $p = 0.613$, $\eta^2_g = 0.001$, $\text{power}_{\alpha=0.05} = 0.081$) due to lack of statistical power.

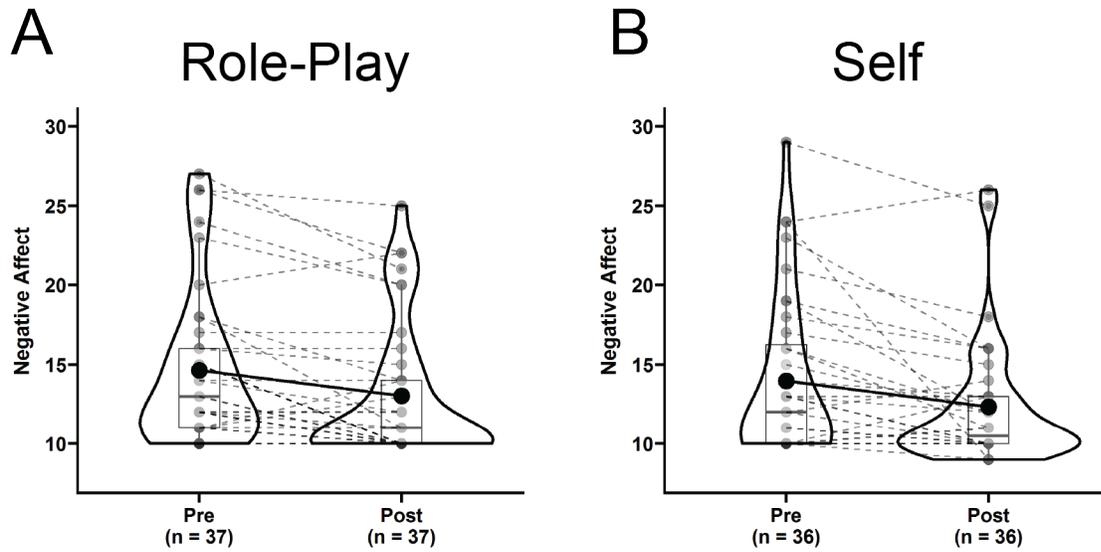
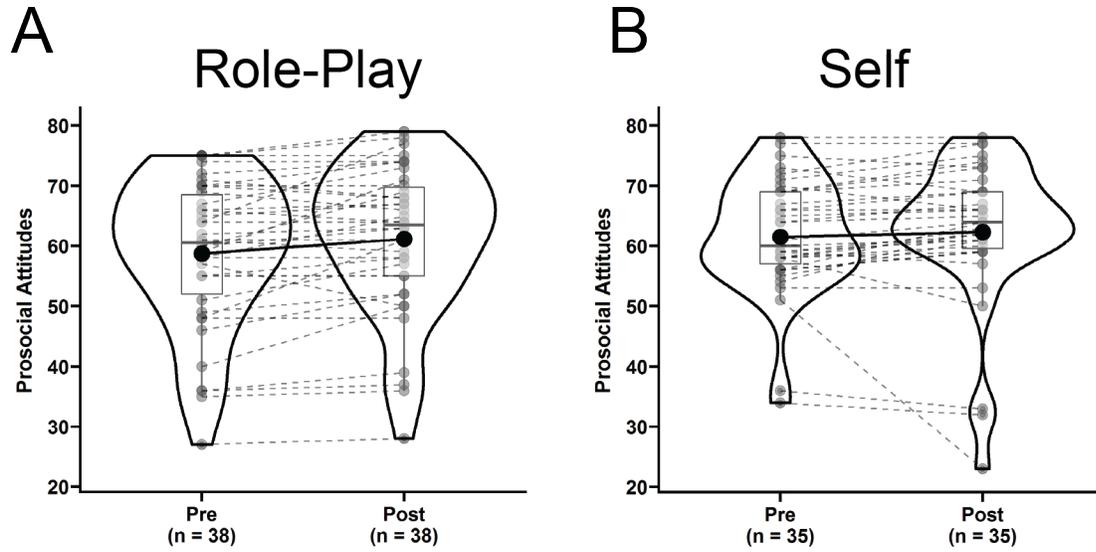


Figure 2: A. Role-play decreases negative affect. B. Participating in dramatic action as self, decreases negative affect.

Effects of role-play on prosocial attitudes and anxiety

The ‘Role-play’ condition was associated with a significant increase in perceived Prosocial Attitudes (**Figure 3A**, $t(37) = 3.42$, $p = 0.002$, $g = 0.54$, $95\%CI = [0.21, 0.89]$, $power_{\alpha=0.05} = 0.903$). This was not the case for the ‘Self’ condition (**Figure 3B**, $t(34) = 0.75$, $p = 0.458$, $g = 0.12$, $95\%CI = [-0.21, 0.45]$, $power_{\alpha=0.05} = 0.110$). In the repeated measures ANOVA, the

Time×Condition interaction failed to reach significance ($F(1,31) = 2.382, p = 0.133, \eta^2_g = 0.002, \text{power}_{\alpha=0.05} = 0.348$). Although, statistical power still lacked, we observed a significant main effect for Time ($F(1,31) = 4.393, p = 0.044, \eta^2_g = 0.005, \text{power}_{\alpha=0.05} = 0.567$).



3: A. Role-play increases prosocial attitudes. B. Participating in dramatic action as self does not change prosocial attitudes.

The anxiety measure was completed only by 29 participants in the ‘Role-play’ condition and 26 in the ‘Self’ condition. Still, anxiety levels were significantly decreased after ‘Role-play’ (**Figure 4A**, $t(28) = 3.22$, $p = 0.003$, $g = 0.58$, $95\%CI = [0.20, 0.98]$, $power_{\alpha=0.05} = 0.857$), but not after ‘Self’ (**Figure 4B**, $t(25) = 1.60$, $p = 0.121$, $g = 0.30$, $95\%CI = [-0.80, 0.70]$, $power_{\alpha=0.05} = 0.321$). Similarly to other results, the decreasing trend within conditions was revealed by a significant main effect of Time in repeated measures ANOVA ($F(1,19) = 5.653$, $p = 0.028$, $\eta^2_g = 0.026$, $power_{\alpha=0.05} = 0.869$). Nevertheless, the sample size available for these analyses was very small and statistical power lacked severely. The Time \times Condition interaction failed to reach significance ($F(1,19) = 0.111$, $p = 0.743$, $\eta^2_g = 0.001$, $power_{\alpha=0.05} = 0.071$).

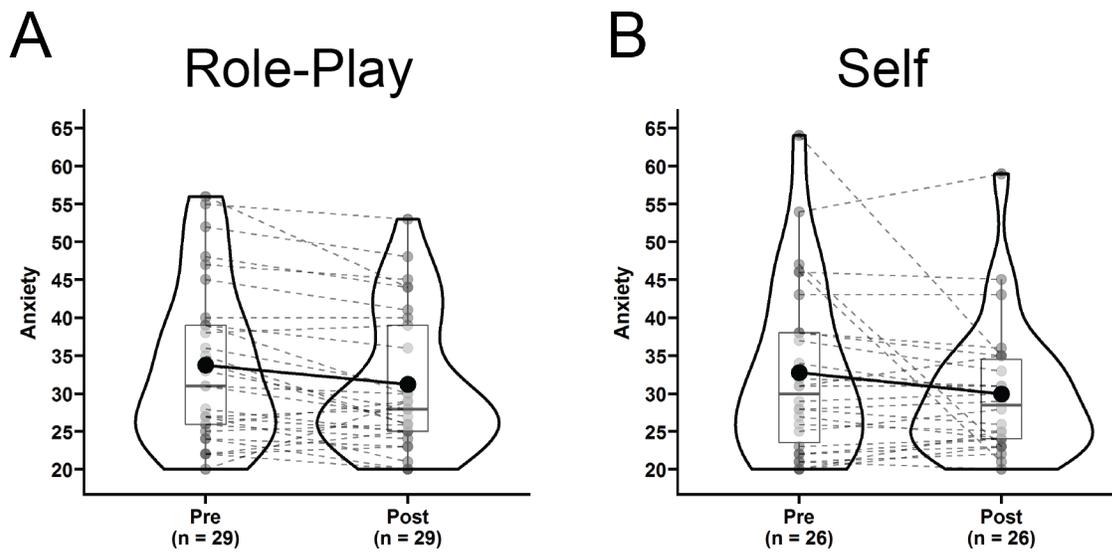


Figure 4: A. Role-play decreases perceived anxiety. B. Participating in dramatic action as self does not change perceived anxiety.

Effects of role-play on salivary oxytocin levels

Oxytocin levels presented a small non-significant increase after ‘Role-play’ (**Figure 5A**, $t(36) = 0.50$, $p = 0.623$, $g = 0.08$, $95\%CI = [0.24, 0.40]$, $power_{\alpha=0.05} = 0.076$). Consequently, ‘Role-play’ would not be associated with higher levels of oxytocin release. However, the ‘Self’ condition was associated with a significant decrease in salivary oxytocin levels (**Figure 5B**, $t(35) = -2.23$, $p = 0.032$, $g = -0.36$, $95\%CI = [-0.70, -0.03]$, $power_{\alpha=0.05} = 0.564$). Although the two experimental conditions showed opposite trends, the Time×Condition interaction in repeated measures

ANOVA failed to reach significance ($F(1,33) = 3.472$, $p = 0.071$, $\eta^2_g = 0.023$, $\text{power}_{\alpha=0.05} = 0.450$).

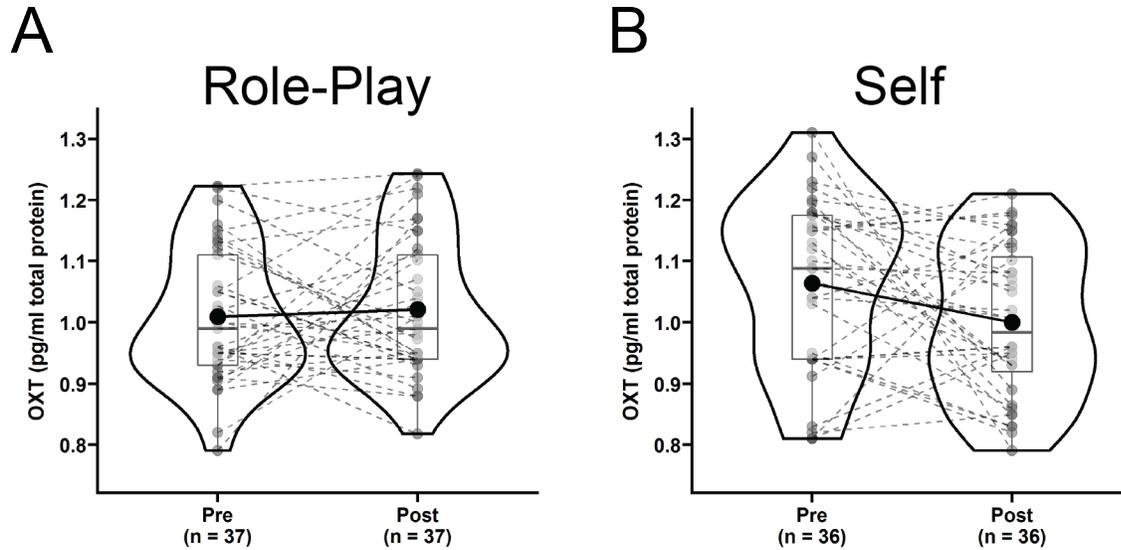


Figure 5: A. Role-play does not significantly change salivary oxytocin. B. Participating in dramatic action as Self decreases salivary oxytocin.

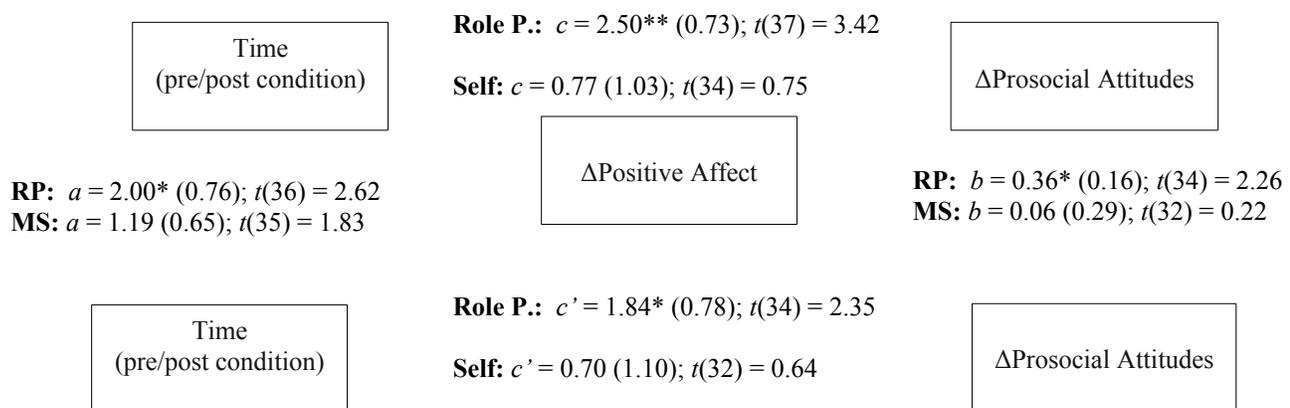
Association between basal salivary oxytocin and the effects of role-play

We also investigated if changes in outcome measures could be accounted for by pre-intervention anxiety states and oxytocin levels. Thus, we fitted linear regression models with dynamic (change) scores as dependent variable and pre-intervention measure as a covariate. Higher anxiety at pre-intervention predicted significantly lower benefits in Positive Affect for ‘Self’ ($\beta = -1.16$, $t(33) = -2.44$, $p = 0.024$), but not for ‘Role-play’ ($\beta = -0.13$, $t(34) = -1.77$, $p = 0.08$). Conversely, higher oxytocin predicted significantly larger gains in Positive Affect for the ‘Role-play’ condition ($\beta = 16.22$, $t(33) = 2.52$, $p = 0.017$), but not for ‘Self’ ($\beta = 7.05$, $t(32) = 1.40$, $p = 0.170$).

To examine indirect effects of time (i.e. pre/post condition) on changes in prosocial attitudes via modifications in positive affect, we applied the recently developed within participant mediation framework developed by (Yzerbyt et al., 2018). Inferences about within-participant mediation are based on a series of hypothesis tests (i.e., component approach; (Judd

et al., 2001) as to not inflate type I errors (Yzerbyt et al., 2018). Accordingly, first it is required to establish the presence of an indirect effect by means of the significance of both individual components (i.e., the joint-significance test concerning paths a and b), and only after proceeding with Monte Carlo resampling to compute the confidence interval for the indirect effect (i.e., the product of the two estimated components – ab). This analysis was conducted using the *JSmediation* package for R (Yzerbyt et al., 2018).

The applied within-participant mediation model confirmed that observed increases in positive affect accounted for the increases in prosocial attitudes (**Figure 6**). The within-participant indirect effect was estimated by Monte Carlo method and was found to be significant ($ab = 0.71$; 95%CI = [0.04, 1.69]) only for the ‘Role-play’ condition, while the same effect was non-significant for the ‘Self’ condition.



DISCUSSIONS

In our study we have designed a standardized method that includes both impersonation and dramatic action induce role-play in a reproducibly and generalizable manner. To isolate the effects of impersonation, we designed a control task based on dramatic (social) action without impersonation. Using this paradigm, we were able to compare the effects of a specific social interaction with and without role-play. We found that role-play significantly increased positive

affect as a function of basal salivary oxytocin levels. This finding could suggest either that participants with higher oxytocin levels immerse in the role-play task more easily, or that oxytocin levels and role-play have converging actions on psychological process and brain structures underlying affect. The gains in positive affect following role-play were correlated with increases in prosocial attitudes scores. Although a role-playing task might be perceived as stressful, anxiety levels at the end of the role-play session were significantly lower than those at the beginning. Negative emotions are associated sometimes to theatrical performance, and they can be attributed to the cognitive dissonance produced by discrepancies between personal beliefs and performed actions (Haarhoff, 2018), as well as to stress induced by high stakes involved especially in professional theatre. Despite this, participants showed a similar decrease in negative emotions following role-play and control conditions.

Several psychological processes could account for the observed results. As early developmental psychologists like (Piaget, 1952) and (Vygotsky et al., 1978) noted, pretend role-play and emotion regulation seem to be ontogenetically intertwined. Regardless of age, emotion regulation is thought to include the use of both effortful and automatic processes that serve to reduce the intensity or frequency of certain emotional states (e.g., lability) and to increase the ability to generate and sustain other emotional states (Hadley et al., 2019). It is suggested that role play may provide an “unusual opportunity” to learn to maintain “comfortable and stimulating” levels of emotional arousal and that successfully doing so will lead to rewarding positive emotions (Fein, 1987, 1989).

Due to its goal orientation and structure according to context-established social rules, role-play should be the preferred medium to enact, exercise and refine the set of processes used to manage feelings, collectively referred to as emotion regulation. More so, specific emotion

regulation skills can be enhanced through teaching and modeling, with role-play being one of the traditional ways to successfully improve emotion regulation skills (Hadley et al., 2019). Multiple potential processes, both inhibitory as well as automatic self-soothing, could be consistent with our observations of increased positive and decreased negative affective states after role play.

Role-play involves attention towards the actions of play, in our case answering from the perspective of the fictional character. It has been argued that a complex type of attention is needed for role-play, involving attentional orienting, episodic retrieval, and mental imagery, together producing in actors a “split consciousness” (Brown et al., 2019). One possible explanation for the observed decrease in anxiety levels might be attributed to the proposed shift in attention from self, due to strong allocation of attentional resources involved in role-play.

Higher anxiety levels at the beginning self-condition predicted lower gains in positive affect but not for role-play suggesting that role-play condition can produce positive affect also on participants experiencing anxiety at the beginning of the role-play condition.

Play is proposed as a generator of positive emotions (Magnuson & Barnett, 2013; Olčar, 2013; Panksepp, 1993, 2000). Social interaction alone can produce positive affect (McIntyre et al., 1991; Papasteri et al., 2020) with effects determined by interaction valence, personality traits and biological factors (Berry & Hansen, 1996; McIntyre et al., 1991; Monninger et al., 2022; Papasteri et al., 2020). In our study, both experimental and control conditions were social, but positive emotion increase was significant just in the role-play condition. We can attribute the observed increase in positive affect to a feeling of relief based on accomplishing a more difficult task, but also to the element of “fun” brought by the playful condition induced by role-play, the funny character as well as the funny hat. Clown therapy is an established intervention for different psychological conditions, associated laughter but also paradoxes and twists of action

contributing to the associated benefits (Gordon et al., 2018). A previous study done found that affect outcomes of role-play might be dependent of emotional content of the role-play, theatrical representations of aggressive behavior increasing auto reported levels of depression both for spectators and performers (Berceanu et al., 2020).

As expected by our hypothesis, the higher positive affect was associated with higher changes in prosocial behavior as measured by APS confirming the facilitation of opinion change through role-play experiences as well as the importance of positive affect in the process.

We can also attribute the changes observed in prosocial attitudes to the use of theory of mind capacity in role-play condition. APS items reflect behaviors and feelings that can be traced to four types of actions: “sharing, helping, taking care of, and feeling empathic”. The “Unlucky” character would always seek to help others, always consider that the others will help him, will be empathic to the others, would be highly disposed to share with everybody and caring for both humans and animals. Role-play condition would put participants in the condition of stating that such behaviors actions and feelings would be characteristic for them, facilitating opinion change. Even with a low degree of embodiment, using the hat as accessory is increasing a contamination effect from the character attitudes towards one owns attitudes as previous studies have shown (Iani, 2019; Janis & King, 1954; Janis & Mann, 1965; King & Janis, 1956).

Cognitive schemas, normative beliefs, world schemas and scripts - are stored in memory and activated by salient cues and further act as guides for social behavior (Huesmann, 1998). Cognitive scripts incorporate declarative and procedural knowledge, prescribing responses. As the activation of scripts repeatedly support responses that have consistent and desirable consequences, the scripts themselves become more salient and readily accessible (Huesmann, 1998). The more extensive and primed the networks are, the more accessible they get

(Huesmann, 1998). The scripts and schemas one has are shaped and reinforced into one's long term memory by enactive learning (Huesmann, 1998) so in a role-play action, own cognitive schemas might be re-shaped by cognitive schemas proposed by the induction script and enacted through verbal action by the participant.

If we think about role-play as a form of play, then reward anticipation, specific to play, might explain some of the observed outcomes. A well-known neural substrate for positive affect is the mesolimbic reward system, specifically the release of dopamine from ventral tegmental area (VTA) into the nucleus accumbens (Arias-Carrión et al., 2010). Work in animal models has shown that both of these structures express receptors for the oxytocin hormone, and that activity of oxytocin fibers can trigger the release of dopamine in this mesolimbic circuit (Dölen et al., 2013; Hung et al., 2017). Modulation of VTA activity by oxytocin was also observed humans in a task involving rewarding and non-rewarding social stimuli (Groppe et al., 2013). Although we do not observe a significant effect of role-play on salivary oxytocin levels post role-play condition, a possible increase might be concealed by task parameters that drive a decrease in oxytocin levels, as we see for the control task. However, the higher levels of oxytocin before the experiment predicted higher gains in positive affect for role-play but not for control condition, indicating a specific substrate involved for the role-play beside social interaction aspect, which is present in both conditions.

In the case of prosocial attitudes, both oxytocin and serotonin action in the nucleus accumbens have been implicated in driving increased social engagement. In humans, changes in central serotonin are difficult to investigate. However, future work should determine if medically increasing brain serotonin (for example by MDMA administration) could saturate the effects of

role-play on prosocial attitudes. Also investigating the role of reward, flow and dopaminergic involvement through brain imaging should be considered.

In acting as well as other forms of role-play, as for instance in RPG (role-play games) or LARP (live action role-play), different strategies can be used to role-play (Kipper, 1986; Kipper & Har-Even, 1984). Although approaches and strategies in role-play can be very different as in mime, realist acting or shamanic rituals and each of these approaches of role-play could involve different psychological process and subsequently different brain processing substrates it is proposed that they all share a common ground at the level of “proto-acting” (Brown, 2017). Further studies are needed to enlarge knowledge on neural and psychological process involved in role play, combining them with strategies for imaging and neurochemical components. Such studies would bring light to crucial aspects of role-play contributing to a general understanding of this human behavior at the basis of creativity in theatre and other arts.

Limitations

Although with a small sample (n=38) our study showed some strong significant results, it will be important to repeat this study on a larger sample size. Participants in our study did not have prior theatrical training so the novelty of the task, wearing a funny hat might also have a contamination effect at affect level, but this could also be part of real-world role-play experience, where make-up, dress and experiencing the other is key component.

It is important to note that salivary oxytocin does not accurately reflect central oxytocin levels and its importance and mechanism of action for brain process remains to be elucidated (Jurek & Neumann, 2018).

The questionnaire used to measure prosocial attitudes (APS) was not designed for repeated measures but to capture traits, so it was used in our study with a different purpose than its validation. We consider the measure as a tool to observe opinion change, previously reported to be produced by role-play (Janis & King, 1954; Janis & Mann, 1965). In a follow up study with 10 participants at three sessions of role-play and 10 different participants in control condition (no intervention) we have observed that participants in role-play also had significantly higher scores for positive affect after the third sessions of role-play, but not participants in the control condition. At a follow up of 10 days those changes were still present for role-play condition but not at significance level.

Our study did not control for participant gender impact on psychological and biochemical measures. Similarly, we did not control for the gender of interviewer and experimenter - all interviewers in our study were females. A further study accounting for gender influence is of interest and it should include male experimenters.

Funding

The study was financed by the project “Developing a methodology of therapy through theatre with an effect at the neurochemical and neurocognitive levels” (MET) co-financed by the European Regional Development Fund (ERDF) and the Romanian Government through Competitiveness Operational Program 2014–2020, SMIS code 106688 and implemented by UNATC “I. L. Caragiale,” CINETic Centre, LDCAPEI LAB.

Author Contributions

All authors contributed to the design of the experiment and interpretation of results. CP analyzed all behavioral data. CP (5th author) analyzed biochemical data. AB, AS, RB, and ND

conducted the experiments and data collection. AB (1st author), CP (second author), and IC wrote the manuscript, with feedback from all authors. All authors contributed to the article and approved the submitted version.

Acknowledgments

We thank to all the managerial team and the administrative support of UNATC, to Alexandra Blejan, Nicoleta Pușcașu and Doina Strat for their technical support, professors Horia Murgu, Adrian Titieni and Robert C. Froemke for their contributions in the MET project as well to all the members of the MET project team, professor Dragoș Cârnelci for facilitating participant access in the study and to all our participants which participated to the MET project.

Ethic Statement

The study was reviewed and approved by Ethics Committee of the University of Theatre and Film “I. L. Caragiale” Bucharest. The patients/participants provided their written informed consent to participate in this study.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Data Availability Statement

The datasets generated for this study are available on request to the corresponding author.

References

- Acharya, H., Reddy, R. P., Hussein, A., Bagga, J., & Pettit, T. (2019). The effectiveness of applied learning: an empirical evaluation using role playing in the classroom. *Journal of Research in Innovative Teaching & Learning*, 12(3), 295–310. <https://doi.org/10.1108/JRIT-06-2018-0013>
- Alessandri, G., Caprara, G. V., Eisenberg, N., & Steca, P. (2009). Reciprocal relations among self-efficacy beliefs and prosociality across time. *Journal of Personality*, 77(4), 1229–1259. <https://doi.org/10.1111/j.1467-6494.2009.00580.x>

- Arias-Carrión, O., Stamelou, M., Murillo-Rodríguez, E., Menéndez-González, M., & Pöppel, E. (2010). Dopaminergic reward system: a short integrative review. *International Archives of Medicine*, 3, 24. <https://doi.org/10.1186/1755-7682-3-24>
- Arifah, N. T., Japar, M., & G. Bachtiar, I. (2018). Improving Social Attitudes and Knowledge Through Role Playing Method. *American Journal of Educational Research*, 6(7), 1040–1045. <https://doi.org/10.12691/education-6-7-23>
- Bartz, J. A., Zaki, J., Bolger, N., & Ochsner, K. N. (2011). Social effects of oxytocin in humans: Context and person matter. *Trends in Cognitive Sciences*, 15(7), 301–309. <https://doi.org/10.1016/j.tics.2011.05.002>
- Bentley, E. (1962). Who Was Ribot? Or: Did Stanislavsky Know Any Psychology? *The Tulane Drama Review*, 7(2), 127–129. <https://doi.org/10.2307/1125069>
- Berceanu, A. I., Matu, S., & Macavei, B. I. (2020). Emotional and Cognitive Responses to Theatrical Representations of Aggressive Behavior. *Frontiers in Psychology*, 11, 1785. <https://doi.org/10.3389/fpsyg.2020.01785>
- Berry, D. S., & Hansen, J. S. (1996). Positive affect, negative affect, and social interaction. *Journal of Personality and Social Psychology*, 71(4), 796–809. <https://doi.org/10.1037/0022-3514.71.4.796>
- Brown, S. (2017). Proto-Acting as a New Concept: Personal Mimicry and the Origins of Role Playing. *Humanities*, 6(2), 43. <https://doi.org/10.3390/h6020043>
- Brown, S., Cockett, P., & Yuan, Y. (2019). The neuroscience of Romeo and Juliet: an fMRI study of acting. *Royal Society Open Science*, 6(3), 181908. <https://doi.org/10.1098/rsos.181908>
- Butler, A., Chapman, J., Forman, E., & Beck, A. (2006). The empirical status of cognitive-behavioral therapy: A review of meta-analyses. *Clinical Psychology Review*, 26(1), 17–31. <https://doi.org/10.1016/j.cpr.2005.07.003>
- Caillois, R. (2001). *Man, play, and games* (first). University of Illinois Press. <https://doi.org/10.1080/21594937.2020.1778277>
- Caprara, G. V., Steca, P., Zelli, A., & Capanna, C. (2005). A New Scale for Measuring Adults' Prosocialness. *European Journal of Psychological Assessment*, 21(2), 77–89. <https://doi.org/10.1027/1015-5759.21.2.77>
- Clark, D. A., & Beck, A. T. (2010). *Cognitive Therapy of Anxiety Disorders*. The Guilford Press.
- Connolly, R., & Ralley, R. (2007). The Laws of Normal Organic Life or Stanislavski Explained: Towards a scientific account of the subconscious in Stanislavski's system. *Studies in Theatre and Performance*, 27(3), 237–259. https://doi.org/10.1386/stap.27.3.237_1
- Corbett, B. A., Qualls, L. R., Valencia, B., Fecteau, S.-M., & Swain, D. M. (2014). Peer-Mediated Theatrical Engagement for Improving Reciprocal Social Interaction in Autism Spectrum Disorder. *Frontiers in Pediatrics*, 2, 110. <https://doi.org/10.3389/fped.2014.00110>
- Corbett, B. A., Swain, D. M., Coke, C., Simon, D., Newsom, C., Houchins-Juarez, N., Jenson, A., Wang, L., & Song, Y. (2014). Improvement in social deficits in autism spectrum disorders using a theatre-based, peer-mediated intervention. *Autism Research: Official Journal of the International Society for Autism Research*, 7(1), 4–16. <https://doi.org/10.1002/aur.1341>
- Corsini, R. J. (2010). *Role Playing in Psychotherapy*. Transaction Publishers.
- Dagnan, D., Jackson, I., & Eastlake, L. (2018). A systematic review of cognitive behavioural therapy for anxiety in adults with intellectual disabilities. *Journal of Intellectual Disability Research*, 62(11), 974–991. <https://doi.org/https://doi.org/10.1111/jir.12548>
- Dagnan, D., & Jahoda, A. (2006). Cognitive–Behavioural Intervention for People with Intellectual Disability and Anxiety Disorders. *Journal of Applied Research in Intellectual Disabilities*, 19(1), 91–97. <https://doi.org/https://doi.org/10.1111/j.1468-3148.2005.00283.x>

- Daisy, F., & Saoirse, F. (2019). *What is the evidence on the role of the arts in improving health and well-being? A scoping review*.
- Dölen, G., Darvishzadeh, A., Huang, K. W., & Malenka, R. C. (2013). Social reward requires coordinated activity of nucleus accumbens oxytocin and serotonin. *Nature*, *501*(7466), 179–184. <https://doi.org/10.1038/nature12518>
- Fein, G. G. (1987). Pretend play: Creativity and consciousness. In P. Gorlitz & J. Wohlwill (Eds.), *Curiosity, imagination and play* (pp. 281–304). Lawrence Erlbaum Associates.
- Fein, G. G. (1989). Mind, meaning, and affect: Proposals for a theory of pretense. *Developmental Review*, *9*(4), 345–363. [https://doi.org/https://doi.org/10.1016/0273-2297\(89\)90034-8](https://doi.org/https://doi.org/10.1016/0273-2297(89)90034-8)
- Feniger-Schaal, R., & Orkibi, H. (2020). Integrative systematic review of drama therapy intervention research. In *Psychology of Aesthetics, Creativity, and the Arts* (Vol. 14, Issue 1, pp. 68–80). Educational Publishing Foundation. <https://doi.org/10.1037/aca0000257>
- Freeman, G. D., Sullivan, K., & Fulton, C. R. (2003). Effects of creative drama on self-concept, social skills, and problem behavior. *The Journal of Educational Research*, *96*(3), 131–138. <https://doi.org/10.1080/00220670309598801>
- Goffman, E. (1959). *The Presentation of Self in Everyday Life*. Anchor.
- Goldstein, T. R. (2009). Psychological perspectives on acting. *Psychology of Aesthetics, Creativity, and the Arts*, *3*(1), 6–9. <https://doi.org/10.1037/a0014644>
- Gordon, J., Shenar, Y., & Pendzik, S. (2018). Clown therapy: A drama therapy approach to addiction and beyond. *Arts in Psychotherapy*, *57*(December 2017), 88–94. <https://doi.org/10.1016/j.aip.2017.12.001>
- Gresham, F. M., Cook, C. R., Crews, S. D., & Kern, L. (2004). Social Skills Training for Children and Youth with Emotional and Behavioral Disorders: Validity Considerations and Future Directions. *Behavioral Disorders*, *30*(1), 32–46. <https://doi.org/10.1177/019874290403000101>
- Groppe, S. E., Gossen, A., Rademacher, L., Hahn, A., Westphal, L., Gründer, G., & Spreckelmeyer, K. N. (2013). Oxytocin Influences Processing of Socially Relevant Cues in the Ventral Tegmental Area of the Human Brain. *Biological Psychiatry*, *74*(3), 172–179. <https://doi.org/10.1016/j.biopsych.2012.12.023>
- Haarhoff, È. (2018). The use of embodied imagination and empathy to bridge actor–character dissonance. *South African Theatre Journal*, *31*(1), 115–132. <https://doi.org/10.1080/10137548.2017.1417741>
- Hadley, W., Houck, C., Brown, L. K., Spitalnick, J. S., Ferrer, M., & Barker, D. (2019). Moving Beyond Role-Play: Evaluating the Use of Virtual Reality to Teach Emotion Regulation for the Prevention of Adolescent Risk Behavior Within a Randomized Pilot Trial. *Journal of Pediatric Psychology*, *44*(4), 425–435. <https://doi.org/10.1093/jpepsy/jsy092>
- Havens, R. (2019). Using role play to teach social emotional skills in the early childhood classroom [Master’s Theses]. In *NW commons*. Northwestern College - Orange City.
- Henderson, S., & King, D. (2021). “This is the Funniest Lesson”: The Production of Positive Emotions During Role-Play in the Middle Years Science Classroom. In P. White, J. Raphael, & K. van Cuylenburg (Eds.), *Science and Drama: Contemporary and Creative Approaches to Teaching and Learning* (pp. 179–196). Springer. <https://eprints.qut.edu.au/211226/>
- Herrera, F., Bailenson, J., Weisz, E., Ogle, E., & Zak, J. (2018). Building long-term empathy: A large-scale comparison of traditional and virtual reality perspective-taking. In *PLoS ONE* (Vol. 13, Issue 10). <https://doi.org/10.1371/journal.pone.0204494>

- Hersen, M., Bellack, A. S., & Himmelhoch, J. M. (1980). Treatment of Unipolar Depression with Social Skills Training. *Behavior Modification*, 4(4), 547–556. <https://doi.org/10.1177/014544558044008>
- Huang, Y., Huang, X., Ebstein, R. P., & Yu, R. (2021). Intranasal oxytocin in the treatment of autism spectrum disorders: A multilevel meta-analysis. *Neuroscience & Biobehavioral Reviews*, 122, 18–27. <https://doi.org/https://doi.org/10.1016/j.neubiorev.2020.12.028>
- Huesmann, L. R. (1998). 4 - *The Role of Social Information Processing and Cognitive Schema in the Acquisition and Maintenance of Habitual Aggressive Behavior* (R. G. Geen & E. B. T.-H. A. Donnerstein, Eds.; pp. 73–109). Academic Press. <https://doi.org/https://doi.org/10.1016/B978-012278805-5/50005-5>
- Hung, L. W., Neuner, S., Polepalli, J. S., Beier, K. T., Wright, M., Walsh, J. J., Lewis, E. M., Luo, L., Deisseroth, K., Dölen, G., & Malenka, R. C. (2017). Gating of social reward by oxytocin in the ventral tegmental area. *Science (New York, N.Y.)*, 357(6358), 1406–1411. <https://doi.org/10.1126/science.aan4994>
- Iani, F. (2019). Embodied memories: Reviewing the role of the body in memory processes. *Psychonomic Bulletin and Review*, 26(6), 1747–1766. <https://doi.org/10.3758/s13423-019-01674-x>
- Ingersoll, V. H. (1973). Role playing, attitude change, and behavior. *Organizational Behavior and Human Performance*, 10(2), 157–174. [https://doi.org/10.1016/0030-5073\(73\)90010-X](https://doi.org/10.1016/0030-5073(73)90010-X)
- Janis, I. L., & King, B. T. (1954). The influence of role playing on opinion change. *Journal of Abnormal Psychology*, 49 2, 211–218.
- Janis, I. L., & Mann, L. (1965). Effectiveness of emotional role-playing in modifying smoking habits and attitudes. *Journal of Experimental Research in Personality*, 1(2), 84–90.
- Judd, C. M., Kenny, D. A., & McClelland, G. H. (2001). Estimating and testing mediation and moderation in within-subject designs. In *Psychological Methods* (Vol. 6, Issue 2, pp. 115–134). American Psychological Association. <https://doi.org/10.1037/1082-989X.6.2.115>
- Jurek, B., & Neumann, I. D. (2018). The Oxytocin Receptor: From Intracellular Signaling to Behavior. *Physiological Reviews*, 98(3), 1805–1908. <https://doi.org/10.1152/physrev.00031.2017>
- Kanacri, L., Paula, B., Eisenberg, N., Tramontano, C., Zuffiano, A., Caprara, M. G., Regner, E., Zhu, L., Pastorelli, C., & Caprara, G. V. (2021). Measuring Prosocial Behaviors: Psychometric Properties and Cross-National Validation of the Prosociality Scale in Five Countries. *Frontiers in Psychology*, 12, 693174. <https://doi.org/10.3389/fpsyg.2021.693174>
- Karatay, G., & Baş, N. G. (2017). Effects of role-playing scenarios on the self-efficacy of students in resisting against substance addiction: A pilot study. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, 54. <https://doi.org/10.1177/0046958017720624>
- Kashiha, H., & Chan, S. H. (2013). The Effect of Role-play on EFL Learners' Retention and Recall of Idiomatic Expressions. *TESOL*, 9(1), 99–116.
- King, B. T., & Janis, I. L. (1956). Comparison of the effectiveness of improvised versus non-improvised role-playing in producing opinion changes. *Human Relations*, 9, 177–186. <https://doi.org/10.1177/001872675600900202>
- Kingsep, P., Nathan, P., & Castle, D. (2003). Cognitive behavioural group treatment for social anxiety in schizophrenia. *Schizophrenia Research*, 63(1), 121–129. [https://doi.org/https://doi.org/10.1016/S0920-9964\(02\)00376-6](https://doi.org/https://doi.org/10.1016/S0920-9964(02)00376-6)
- Kipper, D. A. (1986). The Effect Of Two Kinds Of Role Playing On Self-Evaluation Of Improved Assertiveness. *Journal of Clinical Psychology*, March, 48(02), 246–250.

- Kipper, D. A., & Har-Even, D. (1984). Role-playing techniques: The differential effect of behavior simulation interventions on the readiness to inflict pain. *Journal of Clinical Psychology*, 40(4), 936–941. [https://doi.org/10.1002/1097-4679\(198407\)40:4<936::AID-JCLP2270400411>3.0.CO;2-5](https://doi.org/10.1002/1097-4679(198407)40:4<936::AID-JCLP2270400411>3.0.CO;2-5)
- Landgraf, R., Häcker, R., & Buhl, H. (1982). Plasma vasopressin and oxytocin in response to exercise and during a day-night cycle in man. *Endokrinologie*, 79(2), 281–291.
- Landy, R. (2009). Role Theory and the Role Method of Drama Therapy. In D. R. Johnson & R. Emunah (Eds.), *Current Approaches in Drama Therapy* (2nd ed., pp. 65–79). Charles C. Thomas.
- Landy, R., Luck, B., Conner, E., & McMullian, S. (2003). Role profiles: A drama therapy assessment instrument. *Arts in Psychotherapy*, 30(3), 151–161. [https://doi.org/10.1016/S0197-4556\(03\)00048-0](https://doi.org/10.1016/S0197-4556(03)00048-0)
- Leppanen, J., Cardi, V., Ng, K. W., Paloyelis, Y., Stein, D., Tchanturia, K., & Treasure, J. (2017). Effects of Intranasal Oxytocin on the Interpretation and Expression of Emotions in Anorexia Nervosa. *Journal of Neuroendocrinology*, 29(3), n/a. <https://doi.org/10.1111/jne.12458>
- Liron, Y., Raindel, N., & Alon, U. (2018). Dramatic action: A theater-based paradigm for analyzing human interactions. *PLOS ONE*, 13(3), e0193404. <https://doi.org/10.1371/journal.pone.0193404>
- Lola, C. (2010). *Lee Strasberg Notes* (C. Lola, Ed.). Routledge.
- Magnuson, C. D., & Barnett, L. A. (2013). The Playful Advantage: How Playfulness Enhances Coping with Stress. *Leisure Sciences*, 12(2), 129–144. <https://doi.org/10.1080/01490400.2013.761905>
- Mann, L. (1967). The effects of emotional role playing on desire to modify smoking habits. *Journal of Experimental Social Psychology*, 3(4), 334–348. [https://doi.org/https://doi.org/10.1016/0022-1031\(67\)90002-9](https://doi.org/https://doi.org/10.1016/0022-1031(67)90002-9)
- McIntyre, C. W., Watson, D., Clark, L. A., & Cross, S. A. (1991). The effect of induced social interaction on positive and negative affect. In *Bulletin of the Psychonomic Society* (Vol. 29, Issue 1, pp. 67–70). Psychonomic Society. <https://doi.org/10.3758/BF03334773>
- Monninger, M., Aggensteiner, P.-M., Pollok, T. M., Reinhard, I., Hall, A. S. M., Zillich, L., Streit, F., Witt, S.-H., Reichert, M., Ebner-Priemer, U., Meyer-Lindenberg, A., Tost, H., Brandeis, D., Banaschewski, T., & Holz, N. E. (2022). Real-time individual benefit from social interactions before and during the lockdown: the crucial role of personality, neurobiology and genes. *Translational Psychiatry*, 12(1), 28. <https://doi.org/10.1038/s41398-022-01799-z>
- Moreno, J. L. (1946). *Manuale di psicodramma* (1985th ed.). Astrolabio.
- Morgan, J., & Banerjee, R. (2006). Social Anxiety and Self-Evaluation of Social Performance in a Nonclinical Sample of Children. In *Journal of Clinical Child and Adolescent Psychology* (Vol. 35, Issue 2, pp. 292–301). Lawrence Erlbaum. https://doi.org/10.1207/s15374424jccp3502_13
- Munro, M., Munro, A., Lemmer, K., & Pretorius, M. (2019). Theatre strategies to develop emotional intelligence skills in business communication: An exploratory study. *Southern African Business Review*, 19(2), 1–26. <https://doi.org/10.25159/1998-8125/5838>
- Olčar, D. (2013). The role of positive emotions in play and exploration. *Napredak: Časopis Za Interdisciplinarna Istraživanja u Odgoju i Obrazovanju*, 154.(1–2), 47–60.
- Panksepp, J. (1993). Rough-and-tumble play: A fundamental brain proces. In K. B. MacDonald (Ed.), *Parents and children playing* (pp. 147–184). SUNY Press.
- Panksepp, J. (2000). The neuro-evolutionary cusp between emotions and cognitions: Implications for understanding consciousness and the emergence of a unified mind science. *Consciousness & Emotion*, 1(2), 15–54.

- Papasteri, C. C., Sofonea, A., Boldasu, R., Poalelungi, C., Tomescu, M. I., Pistol, C. A. D., Vasilescu, R. I., Nedelcea, C., Podina, I. R., Berceanu, A. I., Froemke, R. C., & Carcea, I. (2020). Social Feedback During Sensorimotor Synchronization Changes Salivary Oxytocin and Behavioral States. *Frontiers in Psychology, 11*, 531046. <https://doi.org/10.3389/fpsyg.2020.531046>
- Piaget, J. (1952). *Play, dreams and imitation in childhood*. Norton.
- Quintana, D. S., Smerud, K. T., Andreassen, O. A., & Djupesland, P. G. (2018). Evidence for intranasal oxytocin delivery to the brain: recent advances and future perspectives. *Therapeutic Delivery, 9*(7), 515–525. <https://doi.org/10.4155/tde-2018-0002>
- Russell, J., Maguire, S., Hunt, G. E., Kesby, A., Suraev, A., Stuart, J., Booth, J., & McGregor, I. S. (2018). Intranasal oxytocin in the treatment of anorexia nervosa: Randomized controlled trial during re-feeding. *Psychoneuroendocrinology, 87*, 83–92. <https://doi.org/https://doi.org/10.1016/j.psyneuen.2017.10.014>
- Schmitt, N. C. (1986). Stanislavski, Creativity, and the Unconscious. *New Theatre Quarterly, 2*(8), 345–351. <https://doi.org/DOI: 10.1017/S0266464X00002359>
- Shamay-Tsoory, S. G., & Abu-Akel, A. (2016). The Social Salience Hypothesis of Oxytocin. *Biological Psychiatry, 79*(3), 194–202. <https://doi.org/10.1016/j.biopsych.2015.07.020>
- Shirley, D. (2018). His dream of passion: reflections on the work of Lee Strasberg and his influence on British actor training – part two. *Stanislavski Studies, 6*(2), 165–182. <https://doi.org/10.1080/20567790.2018.1496555>
- Spielberger, C. D. (1989). *State-trait anxiety inventory: Bibliography, 2nd edn*. Palo Alto, CA: Consulting Psychologists Press.
- Spielberger, C., Gorsuch, R., Lushene, R., Vagg, P. R., & Jacobs, G. (1983). Manual for the State-Trait Anxiety Inventory (Form Y1 – Y2). In *Palo Alto, CA: Consulting Psychologists Press; Vol. IV*. Mind Garden.
- Stangier, U., Schramm, E., Heidenreich, T., Berger, M., & Clark, D. M. (2011). Cognitive Therapy vs Interpersonal Psychotherapy in Social Anxiety Disorder: A Randomized Controlled Trial. *Archives of General Psychiatry, 68*(7), 692–700. <https://doi.org/10.1001/archgenpsychiatry.2011.67>
- Stanislavski, K. (2003). *An Actor Prepares* (second). Routledge.
- Sterling, M. M. (1993). The Meld Experience in Psychotherapy Supervision. *Journal of Humanistic Psychology, 33*(2), 38–48. <https://doi.org/10.1177/0022167893332006>
- Tilley, D., & Palmer, G. (2013). Enactments in Emotionally Focused Couple Therapy: Shaping Moments of Contact and Change. *Journal of Marital and Family Therapy, 39*, 299–313. <https://doi.org/10.1111/j.1752-0606.2012.00305.x>
- Tomescu, M. I., Papasteri, C. C., Sofonea, A., Boldasu, R., Kebets, V., Poalelungi, C., Podina, I. R., Nedelcea, C. I., Berceanu, A. I., & Carcea, I. (2022). Spontaneous thought and microstate activity modulation by social imitation. *NeuroImage, 240*. <https://doi.org/10.1016/j.neuroimage.2022.118878>
- Toomey, M., Zhou, X., & Yan, X. (2019). Examining the Effectiveness of Using Role-Play Simulations with Chinese Students in China. *International Studies Perspectives, 21*(4), 363–378. <https://doi.org/10.1093/isp/ekz014>
- Tran, V. (2013). Positive Affect Negative Affect Scale (PANAS) BT. In M. D. Gellman & J. R. Turner (Eds.), *Encyclopedia of Behavioral Medicine* (pp. 1508–1509). Springer New York. https://doi.org/10.1007/978-1-4419-1005-9_978

- Vygotsky, L. S., Cole, M., John-Steiner, V., Scribner, S., & Souberman, E. (1978). *Mind in Society: Development of Higher Psychological Processes* (M. Cole, V. John Steiner, S. Scribner, & E. & Souberman, Eds.). Harvard University Press.
- Wah, A. (2018). Cognitive Processes Underlying Play and Pretend Play: A Comparative Cross-Species Study on Degrees of Perception, Imagination, and Metacognition. *American Journal of Play*, 12(2), 156–177.
- Wannenburg, N., & van Niekerk, R. (2019). Re-witnessing the autistic imagination. *Research in Drama Education*, 24(2), 139–146. <https://doi.org/10.1080/13569783.2018.1561256>
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. In *Journal of Personality and Social Psychology* (Vol. 54, Issue 6, pp. 1063–1070). American Psychological Association. <https://doi.org/10.1037/0022-3514.54.6.1063>
- Wedding, D., & Corsini, R. J. (2013). *Current Psychotherapies*. Cengage Learning. <https://books.google.ro/books?id=pSsXAAAAQBAJ>
- Weissman, M. M., Markowitz, J. C., & Klerman, G. (2000). *Comprehensive Guide To Interpersonal Psychotherapy*. Basic Books. <https://books.google.ro/books?id=IO-hKTOCocUC>
- Wilkes-Gillan, S., Bundy, A., Cordier, R., Lincoln, M., & Chen, Y.-W. (2016). A Randomised Controlled Trial of a Play-Based Intervention to Improve the Social Play Skills of Children with Attention Deficit Hyperactivity Disorder (ADHD). *PloS One*, 11(8), e0160558–e0160558. <https://doi.org/10.1371/journal.pone.0160558>
- Yardley-Matwiejczuk, K. M. (1997). *Role Play: Theory and Practice*. Sage.
- Yotis, L. (2006). A review of dramatherapy research in schizophrenia: Methodologies and outcomes. *Psychotherapy Research*, 16(2), 190–200. <https://doi.org/10.1080/10503300500268458>
- Yzerbyt, V., Muller, D., Batailler, C., & Judd, C. M. (2018). New recommendations for testing indirect effects in mediational models: The need to report and test component paths. In *Journal of Personality and Social Psychology* (Vol. 115, Issue 6, pp. 929–943). American Psychological Association. <https://doi.org/10.1037/pspa0000132>