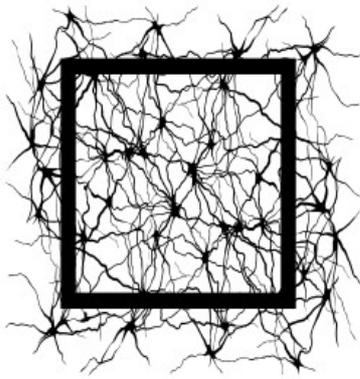


# **Abstracts of Poster Presentations**



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## The Role of Expectation in Change Blindness

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Human may believe that they notice every important change in their environment. However, the phenomenon of change blindness – a failure to notice salient changes to our visual world – tells a different story. The present research investigated the role of expectation in change blindness by using a modified version of the flicker paradigm. The sample consisted of 120 university students (60 females and 60 males) aged between 18-26. The study used two stimuli, ball and clock, which had an original and a changed version. The changes in the images were either in the expected direction with the minute hand of the clock moving clockwise and the ball sliding down or in the unexpected direction. All participants were presented with both stimuli, either in the expected change or unexpected change condition, resulting in four different display types. The order of display types was counterbalanced across participants. Response times for the detection of change were collected. It was hypothesized that response time (RT) for expected changes would be lower than RT for unexpected changes. After the experiment, participants completed a post-experimental questionnaire to confirm that they actually noticed the changes, and that they did not press the button without noticing. The questionnaire also asked participants to state in which direction they had expected the stimuli to move before they saw the changed image. All participants stated the change in the stimulus, and the expected direction for the change correctly. The overall results of the experiment with the two stimuli combined showed that participants were able to detect expected changes faster than unexpected ones, supporting our hypothesis. When the two stimuli were investigated separately, participants were able to detect expected changes faster than unexpected changes for the ball, while the difference between the two conditions was non-significant for the clock. Considering the individual difference in RT, a median split was applied to investigate how the two subgroups behaved. In the upper RT group, participants were able to detect the expected changes faster than the unexpected changes, while in the lower RT group, the difference between the response times of unexpected and expected changes was not significant. The findings are discussed within the framework of expectation-based theories.

# The Algorithmic Theory of Subjective Beauty: A Paradoxical Cognitive Approach

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Based on the algorithmic/formal theory of beauty proposed by Jürgen Schmidhuber, the perception of beauty is basically concerned with compressing data. Accordingly, among patterns classified as comparable by some subjective observer, those of less algorithmic complexity are generally judged more beautiful since they require fewer bits of data. However, experimental findings apparently contradict implications of Schmidhuber's theory for complex patterns; they have shown that the number of elements in a pattern, a measure of complexity, positively correlates with aesthetic preference. Relying upon Schmidhuber's writings on this topic, the author attempts to resolve the apparent contradiction

# Decision-Making Behaviour and Minimal Social Condition: New Insights from Joint Perception

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Although we can control external factors that may affect the process of decision-making in an isolated laboratory environment, we mostly make the decisions in a social environment which is better captured in an experimental situation that allows social interactions. The general aim of the current study is to investigate the effects of social condition on people's decision-making performance in two different domains, namely; economic and moral. The results revealed that even minimalist social condition affects participants' decision-making performance.

# How deficiencies in inhibitory capacity inflates the effect of Looming Cognitive Style on State Anxiety

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The current study investigates the moderator role of inhibitory capacity in the relationship between looming cognitive style and state anxiety. For this purpose, 174 university students were administered the Stroop Test which is a measure of inhibitory control. Participants also completed Looming Maladaptive Style Questionnaire-Revised, Beck Depression Inventory, and State version of the State-Trait Anxiety Inventory. The results showed differential impact of inhibitory capacity in relation to physical and social looming, two components of cognitive looming. The moderator effect of inhibition was significant in the association between physical looming and state anxiety. However, there was no moderator effect of inhibitory control on the relationship between social looming and state anxiety. The results and limitations of the study are discussed.

## Time Bisection Ability is Preserved During Healthy Aging in Supra-Seconds

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In this study, we have demonstrated that the perception of time is preserved with aging in the milliseconds-to-minutes range when cognitive demands are minimized by reducing task complexity and deliberate choice of stimuli range. A total of 66 young (mean age=23.31 years) and old (mean age=67.63 years) participants exhibited similar timing performances in time bisection task on bisection point, Weber ratio and difference limen.

# Processing reflexives in the second language: The time-course of structural and non-structural information

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**Background:** Chomsky's Binding Theory, Principle A (BP-A) (1981) predicts for reflexives (e.g., himself) to be bound by a c-commanding local antecedent. This is mainly true for English, but Turkish reflexives *kendi* and *kendisi* ((him/her)self) do not abide by BP-A (e.g., Kornfilt, 2001). Native speakers were shown to be initially guided by BP-A (e.g., Nicol & Swinney, 1989) or by discourse-level information as well as syntax (e.g., Badecker & Straub, 2002). Sturt (2003) found that although initial stages of antecedent retrieval is informed by structural information associated with BP-A, later stages can be affected by discourse-level information. This study tested the role of syntactic constraints and discourse prominence and linear proximity of the antecedents in Turkish learners' processing of English reflexives.

**Method:** Two eye-tracking experiments (Experiments 1&2) and one pen-and-paper antecedent identification task (Experiment 3) were conducted. The materials were adapted from Sturt (2003). In Experiments 1&2, there were 24 experimental items each consisting of three sentences: (i) a lead-in sentence with the inaccessible antecedent (a proper noun), making it discourse prominent, (ii) the critical sentence with the inaccessible antecedent, the reflexive and the accessible antecedent (a stereotypical male/female noun), (iii) a final wrap-up sentence. In Experiment 1, the accessible antecedent was linearly closer to the reflexive and both antecedents c-commanded it. In Experiment 2, the inaccessible antecedent was linearly closer to the reflexive, but it did not c-command it. Gender congruence between the antecedents and the reflexive was also manipulated, creating a match/mismatch between the reflexive and the (in)accessible antecedents. (See Table 1 for examples.) In Experiment 3, the critical sentences were the same as those in Experiments 1&2 but they were presented both with and without discourse context. The participants (95 in total, Turkish speakers) were advanced learners of English. 48 of them took part in Experiment 1 and the other 47 participated in Experiment 2. All took part in Experiment 3. An additional antecedent identification task with monolingual Turkish speakers tested BP-A in Turkish.

**Results:** In Experiments 1&2 six standard eye-tracking measures (first fixation duration, gaze duration (first-pass reading time at the spillover region), regression path duration, re-reading duration, total duration and the probability of regression out) were entered into a mixed-effects linear or logistic regression model for the disambiguating region (the reflexive) and the spillover region (the two words following the reflexive). In Experiment 1 the participants showed sensitivity to gender (mis)matches associated with the accessible antecedent in regression path duration at the spillover region,  $t = 3.27$ ,  $p < .01$ . In Experiment 2 they showed sensitivity to the accessible antecedent in regression path duration, rereading duration and total duration ( $t$ 's  $> 1.96$ ,  $p$ 's  $< .05$ ) and in the probability of regression out ( $z = 2.05$ ,  $p < .05$ ) at the disambiguating region and in regression path duration at the spillover region ( $t = 2.05$ ,  $p < .05$ ). There was no effect of the inaccessible, discourse prominent antecedent in either experiment. In Experiment 3 participants chose the local and c-commanding antecedent

(> 79%), but in contexts with a discourse prominent inaccessible antecedent, the accessible antecedent choices were reduced,  $z = 5.14$ ,  $p < .001$ . (See Tables 2&3.) The Turkish antecedent identification task confirmed the BP-A violation for Turkish reflexives.

Conclusion: The eye-tracking experiments revealed that Turkish learners of English used structural information associated with BP-A in their antecedent retrieval behavior, but they showed evidence of integrating this information in later measures (e.g., regression path duration, re-reading duration) compared to the early measures (e.g., first fixation duration, first-pass reading time) reported for native speakers in Sturt (2003). Unlike the L2 speakers in Felser and Cunnings (2012), Turkish learners of English did not show an initial sensitivity to the non-structural cues (discourse prominence/linear proximity of antecedents) although they used discourse prominence in their final interpretations (reduced accessible antecedent preference). The results appear to be parallel to those reported in Sturt (2003) with the exception that the L2 learners were slower than native speakers in their integration of structural and non-structural information, which can be attributed to L2 learners' slower processing speed (Hopp, 2006).

## Decoding Cognitive States Using the Bag of Words Model on fMRI Time Series

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Bag-of-words (BoW) modeling has yielded successful results in document and image classification tasks. In this paper, we explore the use of BoW for cognitive state classification. We estimate a set of common patterns embedded in the Functional Magnetic Resonance Imaging (fMRI) time series recorded in three dimensional voxel coordinates by clustering the Blood Oxygen Level Dependent (BOLD) responses. We use these common patterns, called the code-words, to encode activities of both individual voxels and group of voxels, and obtain a BoW representation on which we train linear classifiers.

# A Novel Approach to Emotion Recognition: Convolutional Neural Network Approach and Grad-CAM Generation

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<sup>1</sup>Middle East Technical University

Developments in technology have made human machine interaction an inevitable action. In this regard, one of the biggest milestones is estimating human emotion. Voice is a common medium that is used for estimation. Contemporary literature relies heavily on usage of vectoral representation of sound signals. Current study proposes convolutional neural network and computer vision to be able to develop models that can be reversed engineered. The model developed has feasible predictive power and validity moreover it can produce heatmaps of activations to pinpoint the differentiative prediction not only to a certain frequency but also a time-frequency area in a spectrogram heatmap.

## The Affective and Cognitive Effects of Oral Ketamine in Wistar Rats

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Despite numerous basic and clinical research on clinical depression, there are still a large number of people who experience treatment-resistant depression (TRD) (Swiatek, Jordan, & Coffman, 2016). About 30% of the patients do not respond to conventional antidepressants. Accordingly, alternative pharmacological solutions should be targeted and one candidate has been suggested to be the glutamatergic system.

A critical aspect of the glutamatergic system is its complex ionotropic neuroreceptor, the N-Methyl-D-Aspartic Acid (NMDA) receptor, which has been associated with neural growth, synaptic plasticity, and different types of learning and memory (Stahl, 2013). Increasing number of studies on the NMDA receptor point to the high potential of glutamatergic therapies on depression (Schoevers, et al., 2016). In this regard, ketamine (a non-competitive NMDA receptor antagonist) utilized as a major anesthetic agent, has been the center of attention.”

Initial clinical trials of ketamine administered to patients with major depression by intravenous (IV) injection (0.5mg/kg) during their depressive periods (Berman et al., 2000). Similarly, a pioneering study found that a single anesthetic dose of intraperitoneal (IP) ketamine produced an ameliorative effect on behavioral despair in rats up to 10 days (Yilmaz, Schulz, Aksoy, & Canbeyli, 2002). It is now known that both IV and IP administration of ketamine can lead to an acute therapeutic effect (Kara, et al., 2017; Ma et al., 2013). Yet, finding alternative administration methods could increase its utility as a potential antidepressant.

As an alternative to injection, oral administration of ketamine has successfully been utilized in treating various psychopathologies (Schoevers et al., 2016). Importantly, one such clinical trial showed that major depression patients experienced a significant improvement in depressive symptoms following oral ketamine administration (0.5 mg/kg) for 28 days (Irwin et al., 2013); showing that the antidepressant effects of the drug can be maintained by short-term continuous oral administration at low doses. However, long-term use of ketamine should be investigated further by considering its side effects as well.

Similar to clinical literature, rodent research utilizing low-dose IV/IP ketamine produced contradictory findings: while some have shown that ketamine has no observable cognitive side effect at low doses (Enomoto & Floresco, 2009), others reported a negative impact on different learning and memory paradigms (Venancio et al., 2011).

In the present study, animals were provided with low doses of ketamine (0.2 mg or 0.4 mg) or saline (control) containing solutions for 10 days, after which they were tested in the Forced Swim Test (FST) for behavioral despair and Y-maze for spatial memory.

## Reflection of Affective State Changes on Ultrasonic Vocalization in Wistar Rats

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Humans can only hear sounds between 20 hertz (Hz) and 20 kilohertz (kHz). Rodents, on the other hand, can emit sounds that are beyond our hearing range. Accordingly, such sounds are known as ultrasonic vocalizations (USV). These ultrasonic emissions, used for intraspecies communication, reliably reflect the rodents' affective and neurological states (Brudzynski, 2009; Schwarting, Jegan, & Wöhr, 2007). For instance, rats emit sounds around 22 kHz when they are in an aversive state and 50kHz during appetitive behavior. Rats also use 22 kHz vocalizations as an alarm call for danger. They were shown to make these calls when exposed to the odor of a natural predator such as cats (Litvin, Blanchard, & Blanchard, 2007). Recent studies indicate that these 22 kHz vocalizations are homologous to human crying (Brudzynski, 2013, 2019).

Social isolation and environmental enrichment are two behavioral paradigms with profound effects on rats' affective states and behavior (Simpson & Kelly, 2011), which may be reflected in USV patterns (Portfors, 2007; Schwarting et al., 2007).

In this study, we investigate how a drastic change in living conditions, and thereby the affective state, modulate ultrasonic vocalizations. We created a design in which Wistar rats experienced a 2-day environmental enrichment following 1 month of social isolation.

## Behavioral Effects of Acute Environmental Enrichment in Socially Isolated Rats

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Cemal Akmeşe<sup>1</sup>, Hamza Dinçer<sup>1</sup>, Serkan Salcan<sup>1</sup>, Tuğçe Tuna<sup>1</sup>, Güneş Ünal<sup>1</sup>

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Environmental manipulations have been common methods to elucidate the underlying biological mechanisms of behavior and mental disorders. Donald Hebb (1947) was the first to propose a specific housing condition for this purpose. He has designed a large cage including numerous stimuli that relate to social and physical enrichment for boosting memory performance, and propounded the term Enriched Environment (EE) which stands for “a term for exposing laboratory animals to stimulation that is greater than they would receive under standard housing conditions” (Simpson & Kelly, 2011). Exposing rodents to varying housing conditions (e.g. an enriched or impoverished environment) leads to numerous behavioral and neurochemical effects (Simpson & Kelly, 2011). Animals retained in an EE display better performance in many forms of learning compared to those kept in social isolation (SI), a devastating form of impoverished environment (Larsson, Winblad, & Mohammed, 2002). Likewise, the only study assessing working memory using the Water Y-Maze task revealed that EE animals showed ameliorated corrected alterations compared to SI animals (Van Waas & Soffie, 1996). Resulting better working memory performance must be a consequence of anatomical (e.g. increased neurogenesis) and/or neurochemical alterations (e.g. increase in the number of proteins that are related to neuroplasticity, such as the Brain-derived Neurotrophic Factor, BDNF) particularly in the hippocampal formation (Ickes et al., 2000; Würbel, 2001). Several studies have also found that EE diminishes anxiety, as assessed by the Elevated Plus Maze (Hellemans, Nobrega, & Olmstead, 2005). On the other hand, Brenes, Padilla, and Fornaguera (2009) indicated that animals from the EE group exhibited higher anxiety levels than those from SI. It was also suggested that EE boosted animals’ coping mechanisms by helping the animals to perform more “active behaviors” in the face of such stressors as the Forced Swim Test (FST; Simpson & Kelly, 2011).

It has been shown numerous times that the EE can lead to greater learning and memory performance. On the other hand, there is no a consensus on its effects on anxiety and depression. Importantly, the time period required for EE to create its ameliorative cognitive and disputed antidepressant and anxiolytic effects is still under question.

We have therefore designed a paradigm to assess whether acute EE following a long period of SI is sufficient for any ameliorative effect. In the present study, we examined the behavioral effects of a 3-day acute environmental enrichment exposure following a thirty-day social isolation period on depression, anxiety and working memory, and investigated the neuronal correlates of these, utilizing immunohistochemistry for BDNF and c-Fos, an immediate early gene indicating recent neuronal activity.

## Lexical Categories at the Edge of Extinction

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This study aims to investigate the organization of the lexicon with the assumption that words are category-free in the lexicon by giving examples from Pomak language, which is an understudied, endangered South Slavic language spoken in Thrace (Turkey, Greece and Bulgaria) and Turkish as well as providing experimental results available in the literature. The theoretical framework is mainly Distributed Morphology, (Halle and Marantz, 1993; Halle, 1990; Noyer, 1997) as one of the assumptions of this framework is that roots are category-free units in the encyclopedia and must have categories in their syntactic projection by merging with a functional head that marks the specific category (Embrick & Noyer, 2006). This idea is used in order to explain the gender/word-category-marking suffixes in Pomak. In this study, psycholinguistic and neurolinguistic experiments are also cited to further support the claim that lexical entries do not have word category information stored and available in the lexicon

# Decoding Cognitive States in Complex Problem Solving using Multi-Layer Perceptrons

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In this study, we propose a brain network classification model, Brain decoding with Artificial Neural Networks (B-ANN), based on artificial neural networks to classify high-level cognitive states of complex problem solving task. It was shown that edge weights of brain networks capture the functional connectivities among anatomic brain regions of functional Magnetic Resonance Imaging (fMRI) data. When trained on the edge weights of brain networks extracted from average BOLD activations of anatomical regions, the proposed model outperforms the state of the art classification methods in the fMRI literature. We show the performance of our model under various preprocessing pipelines defined for fMRI datasets, using a complex problem solving dataset.

## The effect of “feeling of being watched” on meta-perception of time

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A key aspect of metacognition is the ability to monitor performance (Flavell, 1979; Fleming & Dolan, 2012; Metcalfe & Shimamura, 1994). Performance monitoring has typically been investigated in the context of two alternative forced choice paradigms where participants are asked to make perceptual judgements. A recent line of work has shown that this ability captures not only the magnitude but also the direction of errors in the context of timing behavior, thereby pointing at the informationally rich composition of error monitoring (Akdoğan & Balçıl, 2017; Duyan & Balçıl, 2017; 2018). Given the attention orienting effects of eye gaze, it has been suggested that direct eye gaze (i.e., eye contact), which has similar social effects with feeling of being watched, enhances bodily self awareness (Baltazar, 2014; Hazem, George, Baltazar & Conty, 2017). In this study we studied if direct eye gaze affects metric error monitoring. Previous research has primarily focused on the effect of feeling of being watched on first order task performance, and overlooked its possible effects on metacognitive judgements. Here, using a temporal reproduction paradigm we aimed to test if direct eye gaze can improve metric error monitoring performance.

We first introduced participants with a target duration of 2300 milliseconds which was kept constant throughout the experiment. We then asked participants to reproduce that duration using two button responses for initiating and terminating duration. Throughout this reproduction phase, participants saw either social (face) or nonsocial (armchair) stimulus, either in its direct or averted orientation. Direct face was used to induce feeling of being watched, and averted face was meant to induce a social presence without a feeling of being watched. Direct and averted armchair pictures were used as a baseline nonsocial conditions. After the reproduction phase, participants reported how confident they were regarding the accuracy of their reproduced duration. After rating their confidence, they also reported towards which direction they thought their reproduced duration deviated from the target duration (i.e., “shorter” or “longer” reproduction than the target duration). We hypothesized that participants’ metacognitive accuracy (i.e., their accuracy in the confidence and short long judgements) would be highest in the direct social condition.

Results showed that, social presence (regardless of the gaze direction) significantly increased the accuracy of the directional error (i.e., short-long) judgements. However, this effect was lost for the accuracy of confidence ratings. We further investigated, if mastery in the first order moderated the effect of feeling of being watched on metacognitive accuracy, as suggested by the Social Facilitation Theory (Zajonc, 1965). We hypothesized that participants with low timing uncertainty (high mastery) would be metacognitively more accurate in the direct eye contact conditions compared to averted gaze and nonsocial stimulus conditions. However, this effect would be reversed for the participants with high timing uncertainty. We calculated the coefficient of variation of time reproductions (CV, which is an index of timing uncertainty) of participants’ reproduced durations, and median split them to represent participants’ mastery levels in the reproduction phase (i.e., lower CV values stand for lower

timing uncertainty, and thus higher mastery). Our results showed no main effect or moderating effect of mastery level on metacognitive accuracy of short-long, and confidence judgements.

Overall, results showed that the effect of feeling of being watched on bodily self awareness only partly applies to error monitoring as the effect was not specific to the direct gaze. Instead we found that faces, irrespective of their gaze direction, increased metacognitive accuracy, only when measured through the short-long judgments and not through confidence judgements. On the other hand, mastery level did not moderate this effect. We discuss the results in the context of social facilitation, bodily self awareness and metacognition literatures.

## Effects of Curiosity, Construal Level and Arousal on Incidental and Intentional Learning

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Intention is one of the systems which is crucial for learning. Based on this concept, intentional learning stands for having intention to learn. On the contrary, learning without any intention can be classified as incidental learning (Hulstijn, 2002). In general, learning systems have been evaluated by behaviourist and cognitivist. However, processes of incidental and intentional learning systems have not been evaluated yet. In an attempt to bridge this gap, 170 university students (Mage = 20.34, 148 females) participated in three experimental studies. To evaluate learning processes, in each task, informative paragraphs and animal pictures were used. To assess intentional learning, participants were asked to fill in the blanks by using informative paragraphs. To assess incidental learning, some information about animal pictures was used and the participants were asked about the framework and the colours of these pictures. In the first study, to examine the effect of curiosity, the pictures of animals were arranged as being common or novel (Paradowski, 1967). In the second study, time manipulation (travelling mentally to the future or focusing on now) was used to examine the effect of construal level (Macrae et al., 2017). In the third study, arousals of the participant were changed by the help of the tempo of the music during the experiment. The results suggested that different levels of curiosity created significant differences on both incidental and intentional learning. Low curiosity level was more effective on incidental learning; on the other hand, high curiosity level was more effective on intentional learning. In addition, differences on construal levels have significant effects on intentional learning. That is, low construal level (i.e., focusing on now) increased intentional learning. However, there was no significant change in incidental learning in both conditions. Lastly, low arousal has an influential effect on incidental learning; however, it was not the case for intentional learning.

## Durational Bases of Rhythm in Language: Musical Priming for Metrical Speech

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Stress has dominated research of linguistic rhythm as the rhythm-inducing parameter of speech, yet languages are not homogenous in regard to the nature of the relevant parameter. A poetic meter devised in Turkish poetry suggests duration as a function of syllable structure is a constituent of rhythm in Turkish. In a phoneme detection task using a cross-modal priming paradigm that was modified from Cason and Schön (2012), duration-based rhythmic primes were employed to prime pseudo- and non-words consisting of closed and open syllables. Primes resulted in faster reaction times compared to baseline, yet a trisyllabic word advantage over bisyllabic words obscures further interpretation. We are currently running a replication study of Cason & Schön to better interpret our findings in Experiment 1. A third study decomposing the number- and structure-based constituents of the rhythmic configuration suggested by the aforementioned poetic meter will be proposed.

## Differences in Brain Oscillations During Perceptual Reversals in Young and Older Adults

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**Background:** If we observe reversible figures (e.g. Necker cube) for a duration of time, what we see alternates between figures' possible perceptual interpretations (Necker, 1832). Decades of rigorous studying convinced most researchers that both top-down and bottom-up processes play distinguishable but complementary roles in producing this conscious experience.

**Method:** In order to delineate effects of aging on top-down and bottom-up processes in multistable perception, 65 (12 male) young adult participants included in this study and 50 older adults are going to participate in future. Participants were shown reversible Necker cube and Necker lattice figures and asked to report perceptual reversals. In order to explore underlying neural correlates, we are going to conduct an electroencephalography (EEG) recording with same stimuli for this study.

**Results:** Goodness of fit analyses were conducted with mean dwell times of percepts that were initially seen by majority of participants (e.g. bottom-right for Necker lattice, bottom-left for Necker cube). Results show that both variables fit to gamma distribution well. There was no difference in reversal counts between figures.

**Conclusion:** Initial results are consistent with the literature. Future experiments with older adults and with EEG recordings should yield reliable and valid results.

## The Role of Mindfulness in Theory of Mind and Mild Depression

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Theory of mind (ToM) is an ability to attribute mental states such knowledge, beliefs, desires, feelings and intentions to the self and to others (Premack & Woodruff, 1978). There have been several studies that investigated the relationship between ToM and the other issues. The present study investigates the relationships between mindfulness, theory of mind and mild depression in university students. Participants consisted of 201 students (152 women, 49 men) and their ages were between 18 and 29 ( $M= 21.94$ ). The measures consisted of “Reading Mind from the Eyes Test (RMET)” (Baron-Cohen et al., 1997; standardized into Turkish by Yıldırım et al., 2011), “Five Facets Mindfulness Questionnaire (FFMQ)” (Baer et al., 2006; standardized into Turkish by Kınay, 2013) Beck Depression Inventory (BDI) standardized into Turkish by Hisli in 1984, “Hospital Anxiety and Depression Questionnaire (HAD)” (Zigmond & Sinnead, 1983; standardized into Turkish by Aydemir et al., 1997). The four measures were presented in paper-and-pencil form and counterbalanced order. Half of them firstly were given the Eyes Test, half of them were firstly given questionnaire, participants completed the battery of questionnaires and the Eyes Test in small groups at a designed set of times.

The participants categorized into depression groups according to BDI scores. Non-depression group (BDI score less than 10), consisted of 105 individuals; mild depression group (BDI scores between 10 and 16) consisted of 56 individuals. And forty participants were included in moderate depression group (BDI scores between 17 and 29).

For non-depression group, there were significant positive correlation between the Eyes Test (RMET) scores and the act awareness facet of mindfulness questionnaire. Valence analysis showed that there were positive correlation between the act awareness facet and the positive items of the Eyes Test. For mild depression group, the act awareness facet was significantly related to the negative items of the Eyes Test.

There were significantly negative relationship between mindfulness and depression. For whole sample, total mindfulness scores and the four facets of mindfulness scores (defining, acting with awareness, non-judgement, non-reactivity) were negatively related to depression scores; BDI and also HAD-depression scores.

ANOVA analysis showed that there were not significant differences in theory of mind abilities among depression groups. However, for theory of mind ability, the main effect of gender was found for only mild depression group.

## Anlam-Biçim Eşleme Problemi Olarak Türkçe'deki Çok Sözcüklü İfadeler

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Alanyazında kullanılan teknik bir kavram olarak çok sözcüklü ifadelerin (ÇSİ) tanınması problemi, hem varlık ismi tanıma, hem de mecazi kullanım tanıma problemlerinden farklıdır. ÇSİ'lerin bizim incelememize temel olan özellikleri, birden fazla kelimenin özel bir yorumla bir araya getirilmesidir. Bu noktada “özel yorum” ÇSİ'lerin anlamsal boyutunu, “bir araya getirilmiş olma” ise sözdizimsel boyutunu simgelemektedir. Biz bu iki boyutun aynı gramerde birleştirilmesi halinde ÇSİ'lere yeni bir bakış açısı sunacağı fikrinden yola çıkarak Türkçe için bir modelleme örneği sunmayı planlamaktayız. İncelemeye Türkçedeki ÇSİ'lerin ön sınıflandırmasıyla başlayacağız. ÇSİ grupları belirlendikten sonra, CCG kuramının yöntemlerini kullanarak sözdizimsel zenginlik farkını yakalamaya çalışacağız. Çalışmada yalnızca eylemsel ÇSİ'leri ve bunlar içinde de özellikle deyimisel özellikli olanları inceleyeceğiz.

## In Search of Music - and Language - Related Factors Influencing Rhythmic Grouping

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Auditory processing involves perceiving and segmenting the sound signal by grouping low-level elements while carrying them to higher levels of cognition. Despite decade-long debates, the mechanisms that govern rhythm perception are not well understood. The iambic-trochaic law, proposed as a domain-general, universal mechanism, suggests that elements alternating in intensity or pitch are grouped with the strong element preceding the weak one, forming an “trochee”, and elements alternating in duration are grouped with the long element following the short one (e.g., Langus et al., 2016). Three perception experiments were conducted in order to test the predictions of the ITL with native Turkish speakers and see to what the extent native language affects rhythmic grouping. In Experiment 1a, which was a replication of Iversen, Patel & Ohgushi (2008) study, sequences of tones were presented to native Turkish speakers. The results confirmed the duration prediction of the ITL whereas no strong preference was observed for intensity or pitch alternations. In Experiment 1b, the number of trials were increased and the base tone frequency was decreased to speech-like level while keeping all other variables the same as in Experiment 1a. The results paralleled those of Experiment 1a. In Experiment 2, our goal was to see whether grouping might become more pronounced or change once more language-like the syllables such as /gü/ and /kɪ/ were used instead of sine tones. Results revealed that the sequences alternating in intensity were grouped trochaically; those alternating in duration were grouped iambically, both supporting the ITL, whereas no strong preference was found for grouping of sequences alternating in pitch. This supports Iversen et al’s (2008) proposal that obtained groupings were primed by native language rather than other cultural influences. The results are discussed with respect to the acoustic properties of Turkish stress.

# The Effect of Repetition on Stereotyping in Minimal Group Paradigm

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## 1. Introduction

Illusion of Truth or Truth Effect basically means that evaluating the information to be true if it is encountered before. Since Hasher, Goldstein and Toppino (1977) this effect has been widely researched in the field of marketing, politics and cognitive psychology (Dechene et al, 2009) however there is only a few studies of truth effect in social psychology. Some research on the effect of repetition on stereotypes mention that there is a negative correlation between analytical processing and familiarity. Garcia-Marques and Mackie (2007) showed that being familiar to an individual lead to more stereotypical judgments. In Smith et al (2006) study, participants were exposed to information about a person and asked to rate the target person's personality traits. It has been found that with the induction of repetition, judgments of people about targets tend to be more based on stereotypical information and less individual information.

In this study we aim to investigate the effect of repetition on truth judgments of stereotypical statements under minimal group conditions. Minimal group paradigm was used in order to eliminate probable confounding effects of real groups such as previous experience, emotions or beliefs.

## 2. Method

2.1. Participants: 36 university undergraduate students participated in this study. They were voluntarily recruited.

2.3. Apparatus and Stimulus: Stimuli were designed using SuperLab 4.0 programming software.

Statement Pool Generation: Personality trait list from Anderson (1968) study was translated into Turkish and three Turkish language experts were rated separately each trait in terms of their valance (positive or negative). The traits that all raters have consensus on were listed. 40 positive and 40 negative traits that had the highest meaningfulness score in the original study were used for stereotypical statement preparation in this study. The statements were randomly assigned to over estimators and under estimators.

Statement Examples: "Abartıcı biri içtendir", "Azımsayıcı biri uyumsuzdur".

2.4. Procedure: The participants were run individually. The participants arrived to the lab, welcomed, read the consent form and sit in front of the computer. There were basically three parts in this experiment; minimal group assignment, statement evaluation, identification measurements with demographics. In the first part of the experiment, the participant was presented Numerical Estimation Task (Ratner & Amodio, 2013). They were shown cluster of dots and asked to estimate how many dot they have seen. After three practice trials, they took 10 test trials. A false feedback was given on the computer screen as "please wait, now the computer program is calculating your results". At the end of the first part of experiment, the participant was acknowledged randomly as she is an over estimator or under estimator.

In the second part there were three phases. In the first phase, they were presented 40 statements in random order and instructed to remember these statements. In the second phase they were asked to judge 40 statements (20 new and 20 old) as true or false by pressing two assigned keys on the keyboard. In the third phase they were asked to rate the statement as seen or unseen in the first phase only for manipulation check purposes. In the last part of the experiment identification with the group measured through 4 items and Pictorial Identity Diffusion Scale. After demographics and political orientation questions participants were debriefed and thanked.

### 3. Results

#### 3.1. Truth Judgments

Participants judged stereotypical statements from 8 different categories. A 2X2X2 repeated measures ANOVA was conducted using percentage of truth judgments and it showed that there was a significant main effect of repetition  $F(1, 35) = 27.489, p < .001$ . Repeated statements ( $M = 56.6\%$ ,  $SD = 2.3$ ) were rated as more true than non-repeated statements ( $M = 43.8\%$ ,  $SD = 2.7\%$ )

A significant main effect of group was also found  $F(1, 35) = 8.277, p < .05$ . Statements about in-group members ( $M = 53.5\%$ ,  $SD = 2.5\%$ ) rated as more true than statements about out-group members ( $M = 46.8\%$ ,  $SD = 2.4\%$ ).

A significant main effect of valance was shown  $F(1, 35) = 19.623, p < .001$ . Positive statements ( $M = 56.6\%$ ,  $SD = 2.9\%$ ) were rated as more true than negative statements ( $M = 43.8\%$ ,  $SD = 2.3\%$ ).

There was a significant interaction between group and valance  $F(1, 35) = 8.58, p < .05$ .

Average percentage of true proportions were higher for positive statements especially when the statements is about in group members.

There was also a marginally significant interaction between repetition and valance  $F(1, 35) = 3.56, p = .067$ . Positive statements were rated more true than negative ones especially when the statement is repeated.

#### 3.2. Reaction Time

Participants' response time was measured for each statement category. True and false judgment RTs were analyzed separately. There was no significant main effect of repetition, group or valance for true judgments in terms of RT. However there was a marginally significant 3 way interaction between repetition, valance and group  $F(1, 26) = 3.55, p = .07$ .

Average RT was significantly lower in repeated in group positive statements ( $M = 2480$ ,  $SD = 698$ ) than non-repeated in group positive statement judgments ( $M = 2747$ ,  $SD = 863$ ).

Average RT was significantly lower in repeated in group positive statements ( $M = 2480$ ,  $SD = 698$ ) than repeated out group positive statement judgments ( $M = 2797$ ,  $SD = 763$ ).

### 4. Discussion

In this experiment, the effect of repetition on stereotypes was examined in the limits of minimal group paradigm. Although the truth evaluation finding strongly supports in-group favoritism and truth effect hypothesis, RT data shows some controversy. This experiment provided evidence about the tendency of believing stereotypical judgments more after only one repetition especially when it is in line with their in-group bias.

## Identifying Real and Fake News: A Mouse Tracking Investigation

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Findings reveal that people tend to spread fake news faster than they spread real news. The need for the investigation of this behavior and the factors leading to it through behavioral and lab experiments and surveys is growing. In the present study, a mouse tracking experiment is conducted with the aim of exploring the process of identifying real and fake news. Twenty news headlines comprised four conditions (real news, fake news, real news with a related photo, and fake news with a related photo) were presented, and the participants moved the cursor towards their responses. Following their response, they were asked some questions regarding the news that they just saw. The results suggest that fact-checking frequencies of the participants, the realness and the format of the news affect the identification process of the real and fake news.

## ELECTROPHYSIOLOGICAL CORRELATES OF CRITICAL ANALYTICAL THINKING AND EXECUTIVE FUNCTIONING

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Critical thinking can be defined as purposeful and reasoned thinking that includes problem solving, decision making, estimating probabilities and formulating conclusions while using advanced skills for a particular situation and task. Critical thinking consists of two complementary elements; skills and dispositions. It is improvable and teachable. According to dual process theory, there are two thinking pathways; system 1 which is basic, fast and intuitive, system 2 which is more complex, slow and analytical. Since critical thinking can be considered as complex thinking, it might be related to system 2 thinking. Electrophysiology of our brain changes according to our mental states. Frontal EEG gamma activation is associated with insight and this might be a feature of critical thinkers. On the other hand, executive functions like inhibitory control and cognitive flexibility could be necessary to think critically. The aim of the study was to investigate electrophysiological correlates of critical thinking and explain critical thinking dispositions while considering 2 pathways. The first hypothesis was that system 2 thinking predicts critical thinking dispositions through frontal gamma activation. The second hypothesis suggested that executive functions also predict critical thinking dispositions. To test the model, structural equation modeling was used as the statistic method. According to results, the tendency to think critically can be predicted by system 2 thinking through frontal gamma band activity. However executive functions and critical thinking disposition was not significantly related.

## Artificial Brain Networks

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In this study, we propose a neural network approach to capture the functional connectivities among anatomic brain regions. The suggested approach estimates a set of brain networks, each of which represents the connectivity patterns of a cognitive process. We employ two different architectures of neural networks to extract directed and undirected brain networks from functional Magnetic Resonance Imaging (fMRI) data. Then, we use the edge weights of the estimated brain networks to train a classifier, namely, Support Vector Machines(SVM) to label the underlying cognitive process. We compare our brain network models with popular models, which generate similar functional brain networks. We observe that both undirected and directed brain networks surpass the performances of the network models used in the fMRI literature. We also observe that directed brain networks offer more discriminative features compared to the undirected ones for recognizing the cognitive processes. The representation power of the suggested brain networks are tested in a task-fMRI dataset of Human Connectome Project and a Complex Problem Solving dataset.

## Functional Mechanisms Involved in Reduced Autobiographical Memory Specificity

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Autobiographical memory (AM) specificity measured by Autobiographical Memory Test (AMT) is associated with a range of psychiatric disorders. Individuals diagnosed with psychiatric disorders are more likely to report AMs without specific details in response to cue words. Studies show that depression is linked to more overgeneral negative memory recall in response to negative cue words. Widely accepted CaR-Fa-X model explains this phenomenon by the capture of attention and rumination, functional avoidance, and diminished executive function seen in depression. However, literature shows that there are several brain regions involved in the reduced recall of specific AM and clinical studies indicate other mediator factors such as interpersonal relations, reward mechanisms, perspective shift while recalling AM, personality, emotion regulation, traumatic history and stress exposure, which might have a bidirectional relationship. It is not known if stressful triggers cause rAMS and lead to depression. Assessment of the mediators of rAMS in depression and the direction of their relationship might produce new targets for psychotherapies and medications. In our current study, we aimed to analyse the effect of stress perception, adverse life events and reward processing on AM in a population of university students, in addition to analysing the effect of these mediators in currently depressed individuals, patients in remission and controls. We also aimed to distinguish encoding and retrieval inabilities in order to specify rAMS either as a vulnerability factor for or as a result of depression, using laboratory based behavioral measurements. The preliminary findings of our study will be presented and discussed.

## Ingroup-Outgroup Bias in False Eyewitness Memory

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People generally tend to evaluate their outgroup members more negatively and stereotype-consistently than their ingroup members (Kleider, Cavrak & Knuycky, 2012). These stereotype-consistent judgements are able to alter the accuracy of the memory retrieval about other individuals (Osborne & Davies, 2013). The main aim of the current study is to investigate whether the group belongingness of the suspect (i.e. outgroup or ingroup) and the narrative information given about the observed event (i.e. innocent or guilty) have an effect on the false eyewitness memory occurrence. Participants will watch a film depicting the suspect (i.e. Syrian or Turkish) who can be explained as either innocent or guilty in the narrative after the film. A week later, participants will be tested about their memory of the event. More false memories are expected to be observed in the outgroup-innocent and ingroup-guilty conditions compared to the ingroup - innocent and outgroup - guilty condition, increasing with prejudice towards immigrants.

## Does Metacognitive Ability Predict Learned Helplessness?

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When a person is engaged in a cognitive task, cognitive system not only processes information from the outside but also evaluates its own performance. This is referred to as metacognition, a person's capability of monitoring and regulation of own cognitive processes during performance such as in perception and memory tasks (Fleming & Lau, 2014). Experimentally, metacognition can be assessed by asking participants to evaluate their confidence in their first order task performance (Kepecs & Mainen, 2012). The degree to which these confidence judgements track first order performance is termed metacognitive accuracy. High metacognitive accuracy indicates that the individual can correctly monitor and report the variations in her performance such that an error is paired with a lower confidence in the response compared to a correct response (Fleming, Ryu, Golfinos, & Blackmon, 2014). Learned helplessness refers to an agent's (human or another animal) perceived inability that he can no longer control the environment in order to either escape punishment or acquire rewards (Lieder, Goodman & Huys, 2013; Seligman & Maier, 1967). Crucially, learned helplessness can be induced via repeated negative feedback in cognitive tasks as well as instrumental tasks, suggesting that learned helplessness might depend on metacognitive beliefs. For instance, in a recent study after spending time on solvable or unsolvable anagrams, participants were given the Iowa Gambling task, a task involves rule learning via feedback, to measure their rule-learning performance. Those who worked on unsolvable anagrams, which only gives negative feedback, performed worse than those who did solvable anagrams. In this study repeated negative feedback might be inducing a negative metacognitive belief that the participant cannot perform the given task (Starcke, Agorku, & Brand, 2017). Indeed, research which aimed to directly manipulate participants' beliefs about their competence, showed that such metacognitive beliefs can alter task performance (Zacharopoulos, Binetti, Walsh, & Kanai, 2014). While these studies indicate a potential role for metacognitive beliefs in inducing learned helplessness, they did not directly measure metacognitive processes or accuracy. As such the causal link between metacognition and learned helplessness remains to be elucidated.

Here we attempt to examine the relationship between metacognitive accuracy and learned helplessness. We predict that individuals with high metacognitive accuracy are less susceptible to manipulations on beliefs about competence. Previous research is inconclusive in whether metacognitive accuracy is domain-general trait or whether it depends on the specific first-order task (Fleming et al., 2014; McCurdy et al., 2013). We therefore will measure metacognitive accuracy in two tasks (one perceptual, one memory task) to assess within-individual consistency of meta-cognition. Subsequently, the participants will complete a rule-learning task in which they will attempt to learn a simple rule that predicts the rule in a sequence through trial-and-error. To induce learned helplessness, half of the participants will receive random, thus unreliable, feedback regarding their performance while the other half receives truthful feedback. As a manipulation check on learned helplessness we will give all participants an unsolvable anagram. We predict that if the unreliable feedback successfully induced learned helplessness those participants will spend less time on the anagram, i.e. they will give up sooner. We will then measure the participants' metacognitive accuracy again. If learned helplessness changes metacognitive beliefs about one's performance, we predict to

see diminished metacognitive accuracy in the later task for those in the unreliable feedback condition, compared to those who received reliable feedback. Moreover, we expect participants with high initial metacognitive accuracy to be more resistant to manipulation of belief about competence when compared to those with low metacognitive accuracy. To the best of our knowledge, these results will be the first to link learned helplessness, metacognitive beliefs and individual differences in metacognitive accuracy.

## Facial Affect Analysis of Children During Play Therapy

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Play therapy is an approach to psychotherapy where a child is engaging in play activities. Because of the strong affective component of play, it provides a natural setting to analyze feelings and coping strategies of the child. In this paper, we investigate an approach to track the affective state of a child during a play therapy session. We assume a simple, camera-based sensor setup, and describe the challenges of this application scenario. Our proposed framework uses off-the-shelf deep convolutional neural networks for the processing of the child's face during sessions to automatically extract valence and arousal dimensions of affect, as well as basic emotional expressions. We evaluate our framework with play therapy videos in natural sessions and discuss the results of such analysis and how it aligns with the professional clinicians' assessments.

## Short-term synaptic depression as a suitable mechanism for the verbal transformation effect

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Verbal transformation effect (VTE) refers to the phenomenon in which listening to the same word presented repeatedly leads to multiple interpretations (e.g. 'life life life...' becomes 'fly fly fly...'). Although there are several psychological models trying to account for VTE, the underlying neural mechanisms are largely unknown. Short-term synaptic depression (STD) is a related biophysical mechanism in that constant stimulation of a pre-synaptic neuron reduces the probability of a post-synaptic neuron firing due to neurotransmitter depletion. In addition, the rate of depression depends on whether the action potential activity between pre- and post-synaptic neurons is paired (paired activity results in a faster depression rate). We used 18 Turkish stem words and pseudowords as examples of paired and unpaired AP activity, respectively, in a standard VTE experiment paradigm and found that words remained stable approximately 400 ms shorter on average compared to pseudowords. This difference in stability durations may be due to faster depression of synapses in networks processing words, which suggests that STD could be considered as a suitable neural mechanism for VTE.

## A Neurolinguistic Study of the Processing of Relative Clauses in Turkish

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Psycholinguistic studies on the processing of relative clauses (RCs) in many languages revealed that Subject Relative Clauses (SRCs) are easier to process than Object Relative Clauses (ORC) (see King and Just, 1991; Traxler et al., 2002; King and Kutas, 1995; Just et al., 1996 for English; Frazier, 1987 for Dutch; Frauenfelder et al., 1980 for French; Schriefers et al., 1995 for German). Two recent psycholinguistic studies testing participants' online reading time performance on Turkish RCs claimed support for the above conclusion that SRCs in Turkish are also easier to process than ORCs, though these studies differ from one another in terms of where a slow-down in reading is observed; while Kahraman et al. (2010) found that a slow-down is observed on the RC-verb, Paluluoğlu (2015) found that the slow-down is attested on the head noun/filler. The psycholinguistic work on some Eastern Languages, such as Japanese and Korean, also demonstrated that ORCs induce more processing difficulty than SRCs in these languages. These results have been supported by ERP studies on Japanese and Korean RCs (Ueno and Garnsey, 2008 on Japanese; Kwon et al., 2013 on Korean). In both their psycholinguistic and the ERP studies on Korean, Kwon et al. (2006) and Kwon et al. (2013) demonstrated that the critical items where a slow-down is attested is both the relative clause verb and the head noun, an observation that differs from those made for Turkish. Some other languages like Chinese have been argued to provide ambiguous results in terms of whether ORC or SRCs are processed faster (Hsiao and Gibson, 2003; Lin and Bever, 2006; Gibson and Wu, 2014), and the issue is still controversial. RCs in Basque, an ergative language, have been claimed to show the opposite pattern attested in the other Western languages in that ORCs are easier to process than SRCs. This quick look at the literature makes it clear that there is still controversy on certain points, and thus in the present study we focus our attention in on the following questions by adopting the ERP methodology: (i) Is there ERP evidence that supports previous claims on Turkish that ORCs are more difficult to process than SRCs? (ii) Is the critical item/region at which an ERP component is observed is the relative clause verb or the head noun or both?

Data obtained from 32 participants are analyzed in this study. Grammatical Function (subject, object) × Clause Type (SRC, ORC) × A(nterior)P(osterior) distribution (frontal, parietal) × LAT(eralization) (left, right) factors are used in the statistical analysis. In the first time window, while a P200 component is formed, the difference that the Grammatical Function is  $F(1,31)=4.032$ ,  $p<.05$ , and Phrase Forms are  $F(1,31)=10,849$ ,  $p<.01$ . In the second time window, LAN component is observed, and it is seen that a significant difference of  $F(1,31)=5,589$ ,  $p<.05$  occurs in the interaction between clause type  $F(1,31)=5.283$ ,  $p<.05$ , and Grammatical Function x Clause Type. In the last time window, the difference  $F(1,31)=4.530$ ,  $p<.05$  occurs in the interaction between Grammatical Function and Clause Type, and a late LAN component arises.

The findings of the study demonstrate that (i) ORCs are more difficult to process than SRCs, and (ii) the difficulty in processing is concentrated on the head noun region (i.e., the filler noun) of RCs as indicated by a negativity lateralized to the left anterior regions. Importantly, the processing of RCs is found to be sensitive to what grammatical function the head noun of

an RC bears. As illustrated below, the difference between SRCs and ORCs was only present when they were in the subject function (GF-SUBJ) whereas no such difference appeared when they were in the object function (GF-OBJ) in the sentence they appeared in.

# Qualitatively Different Threats and Their Hindrance on the Working Memory Performance

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Humans have evolved a set of cognitive, affective, behavioral and biological mechanisms to deal with the threats in their environment. Besides the affective and behavioral reactions towards threats, it is well established that threats take more attention and disrupt working memory performance more (Alvarez & Cavanagh, 2004; Öhman, 1993). However, few studies have examined whether there is an attentional prioritization for distinct threats (i.e. violent and pathogenic) as they elicit different emotional and behavioral reactions as well as impose distinct affordances. The current study investigates how working memory allocates attention to threatening and neutral stimulus as well as qualitatively different threats (e.g. violent and pathogenic) by using a working memory paradigm.

## Effect Of Decision Time On Anchoring Bias

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People use heuristic and bias when making a judgment about an uncertain event. When they are asked to enumerate their guess, such as the probability of an event regarding an unfamiliar context, their decision is biased towards the last number they heard. This phenomenon is called the anchoring effect (Tversky & Kahneman, 1974). Underlying mechanism of the anchoring effect is still controversial. Previous research has attempted to explain this effect either with mental adjustment or selective accessibility. Here, we investigate the repeatability of the anchoring effect placing boundary anchor and hidden anchor in questions. We examined if proximity between the responses and the anchor value were affected by decision time, in order to understand the mechanism behind boundary anchoring effect. We hypothesized that responses of the people with longer decision times would be less affected by the anchoring bias due to mental adjustment.

## Children's Trust Judgments about Lie-Tellers

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Deceptive behavior in children has been widely studied, however most studies have focused on children's lie telling behavior or their judgements of appropriateness about a lie-teller. This study instead focused on children's judgments about the trustworthiness of lie-tellers as influenced by children's age (7-, 9- and 11-years-old), the type of lie told (socially-oriented and self-oriented), the trust components (secret-keeping and promise-keeping), and parental socialization factors such as parents' parenting styles and frequency in use of threat lies. Primary school children were selected to investigate the development of trust judgements. Results did not show significant differences in children's trust judgements for self-or socially-oriented lie-tellers in any age. Democratic lie-telling was positively correlated with children's trust judgements about socially-oriented lie tellers whereas authoritarian and over-protective parenting as well as high frequency in parental threat lies had a negative correlation with children's trust judgements about socially-oriented lie-tellers.

## Age 4 transitions: Reflection as a Domain-General Development for Explicit Reasoning

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Understanding others' psychological states (ToM abilities) which is a form of abstract reasoning ability has been thought to develop at around age 4 on the basis of the experiment, done on preschoolers' false belief understanding (Wimmer & Perner, 1983; Wellman, Cross, & Watson, 2001). However, it is argued that before age 4 children cannot pass these ToM tasks as they need additional demands like language and executive functioning. We believe that such debate in development of ToM abilities can be solved by moving the debate from the social domain to the physical domain of abstract reasoning abilities as the tasks in social domain will always need a lot of additional task demands. Therefore, the current study aims to show that children cannot involve in explicit reasoning about objects' properties and their relations until around age 4 because of the domain general shift on children's cognitive abilities. In the study, new tasks were designed and children were asked to predict the consequences of novel manipulations, done on objects to show that before age 4, they can only accurately predict the results of manipulations, about which they have anticipations through their direct perception. Sixty-three (28 male, 35 female) children (aged 3-5 M= 52 months, SD= 11.5) participated to the study. As we expected, 4 and 5-years-old performed significantly better than 3-years-old in both tasks. In both versions, as the situations are novel, children could not have any anticipation about the manipulations, done on the objects in the tasks, which prevent them to implicitly reason and predict the consequences. As a result, before age 4, children cannot abstractly reason about objects even though the tasks need minimal additional demands such as working memory or executive functioning.

## Touching real materials

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We explore things by touch, e.g. fruits or clothes, before deciding whether we want them; in order to perceive material softness, haptic exploration is a crucial ability in daily life. However, people use the attribute soft to describe a wide variety of materials that differ substantially in their physical properties. For instance silk or cream are very different materials in their nature but they are perceived to be more or less soft along different dimensions. We investigated haptic explorations while judging different dimensions of softness by analyzing hand movements in video recordings of participants haptically exploring different soft and non-soft materials. We provide evidence from spatial (anatomical hand landmarks) and temporal (video event coding) analyses of hand movements in a large data set (1400 videos). We discovered a new set of exploratory procedures (EPs) and we show that the nature of the material strongly influences the optimization of the haptic explorations -beyond the previously known influences of the task. We demonstrated that different EPs are distinctively associated with specific dimensions of perceived softness and these EP patterns are predictive for new materials in the same softness dimension. Our findings corroborate the assumption of psychologically different aspects of tactile softness such as roughness, hardness, and coldness; but we show that active explorations reveal more elaborate softness dimensions than textural characteristics or stickiness of materials. We particularly list these dimensions as deformability, granularity, viscosity, and surface softness. This novel way of describing complex hand motions promise valuable future directions for medical and material robotics, which currently rely on suction-like procedures when handling soft materials.

## Is There Any Effect of Different ISI on Tactile Habituation? Preliminary EEG Results

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Habituation is a basic process of learning which can be observed when the sensory stimulus repeated. The habituation mechanism can also be thought as filtering the meaningful information from the real world. In the literature, many studies were aimed to establish visual and auditory stimulation effects on the habituation mechanism. In somatosensory domain generally repeated electrical, vibrational, and heat stimulus was used. The current study aimed to investigate the effects of different inter-stimulus intervals on the habituation process by non-painful tactile stimulations. 7 right-handed volunteers (4F;  $23 \pm 5.7$  age) who have no previous neurological, psychological and chronic diseases, participated in the study. The somatosensory evoked potential (SEP) paradigm was used. 40 stimuli applied in both ISI2 and ISI16 session. Brain responses were recorded via electroencephalography (EEG). The non-painful tactile stimuli ( $\sim 140$  kPa air pressure) stimuli delivered to the pulp of right-hand index finger via the pneumatic stimulation unit. The off-line EEG analyzed by Scan 4.5 (NeuroScan Inc., USA). SPSS (v24) was employed for the statistical analysis. Accordingly, to the analysis, there is a significant increase in amplitudes and durations of brain responses were observed as ISIs are increased. These preliminary results can shed the light the basic habituation process on the somatosensory domain.

# Concentrative Meditation's Effect on Cognitive Flexibility as Measured by the Stroop Effect

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Meditation is a highly practiced technique to create emotional balance, cognitive enhancement and general well-being. Previous studies have suggested that meditation can enhance cognitive flexibility, the ability to adopt new strategies when encountering unexpected conditions and inhibit automatization. This study investigates the effect of meditation on cognitive flexibility by comparing Stroop inferences before and after the intervention among the groups and within the meditation group concerning the experience levels. 30 individuals participated in the study divided into 3 groups, 1 experiment group which practiced meditation for 10 mins., 2 control groups as one of the groups only listened to music and the other participants gave a break between Stroop tasks. While the control group showed a significant decrease in Stroop inference, meditation group's Stroop inference slightly decreased, and the music group showed an increase. In the second analysis, experienced meditators' Stroop inference decreased significantly while meditation-naïve participants showed increasement. We discuss the relevance of these findings and possible limitations.

## Detecting Happiness and Sadness via Image Processing on Instagram

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In the last decade, social media has become a new platform that is used to understand human behavior (Ruth, 2014). Most of the studies about the representation of human behavior on social media performed to analyze emotions or reactions in a text-based social media context (Thelwall, 2010; Quercia, 2012). Over the past two decades, emotion has been described and integrated with cognition (Pessoa, 2013). In this study, emotion-related image posts for happiness and sadness on Instagram were analyzed with an object recognition tool to understand the relationship between objects and emotions. Even though adding text to an Instagram image is much more difficult than adding a general picture, users prefer to share their emotion-related posts with textual context. This behavior has been most observed particularly in sadness.

## The Effect of Contour and Configuration on Visual Crowding

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Visual crowding refers to poor target identification performance due to the presence of flankers in the peripheral vision. This study is aimed to investigate the effect of contour type (sharp vs curved) and configuration type (random vs smooth) in crowded scenes. We compared reaction times (msecs) and accuracy rates (percentile) as outcome variables. We hypothesized that the sharp edged contours should be reacted faster for and more accurately compared to the curved ones because of the hierarchical and pooling models assumed that sharp edged contours have identification advantage due to comprising of simple lines to form a big triangle. We also expected that smooth configuration trials to have better outcome rates compared to random ones because grouping may enable to detect target more accurate and rapid. Results have confirmed the hypotheses that the effect of contour and configuration was obtained from both the accuracy and reaction time analysis.

## An effect of encoding duration on survival processing

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The present study will aim to investigate proximate mechanism of this survival processing effect by manipulating the duration of encoding as the predictions of two previous mechanisms, selective tuning and richness of encoding, differing in terms of the encoding duration. Rationale of the present study will be based on the discrepancies between studies in the reaction time measures for relevance rating. We hypothesize that if the selective tuning hypothesis better explains this phenomenon, within the survival scenario, survival processing effect will diminish in fast conditions for both short and long scenarios because survival processing is an effortful.