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Review Article

Giant Hepatic Subcapsular Pseudocyst of the Pancreas: A Rare Case Report and Review of the Literature

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Abstract:

Current investigations have increasingly demonstrated that the insight of direct gaze from others significantly influences a range of attention and cognitive processes. On the other hand, few research articles are found to explore the emotional consequence of eye contact. This piece of writing delineates a review of empirical research investigating the impact of gaze direction on the affective responses of influencer. The focal point is on studies conducted under meticulously controlled laboratory conditions, where contextual variables that may influence the perceiver's affecting responses have been systematically managed. Two relevant themes emerge from this review. First of all, explicit affective evaluations regarding the perception of direct versus averted gaze have yielded conflicting results; whilst certain studies account enhanced positive subjective feelings associated with direct gaze, others suggest a differing tendency. This deviation in results may stem from variations among studies in the extent to which direct gaze stimuli are capable of eliciting feelings of self-involvement. Secondly, when examining implicit measures, the findings are more homogeneous: research consistently indicates that direct gaze enhances affective stimulation and, crucially, that eye contact automatically elicits a positively valenced affective reply. This appraisal also discusses possible psychological mechanisms underlying the positive emotional reactions provoked by eye contact.

Key words: affect; stimulation; intelligence; feeling; eye contact; gaze; face; psychophysiology

Introduction

Kleinke, 1986 demonstrated that the gaze of other individuals serves as a strong social incentive, playing a critical role in regulating social communications, leading to interactive outgoing objectives, and expressing emotional familiarity and community control. Central to these functions is the ability of directed gaze to signal the focus of attention. People use the gaze patterns of others to distinguish and infer the objects or individuals that attract their attention. A fundamental distinction arises in determining whether another person's gaze is directed towards oneself or away from oneself. Specifically, when individuals observe another's, gaze oriented towards them, it typically suggests their engagement, while an averted stare means a shift in concentration away from oneself. A broad experimental study has substantiated that the direction of another's gaze influences the observer's attention allocation. Moreover, it is well known that direct gaze fosters attention orientation towards faces (von Grünau and Anston, 1995; Senju et al., 2005; Conty et al., 2006; Doi et al., 2009; Shirama, 2012; Böckler et al., 2014; Lyyra et al., 2017). In opposition, an individual's gaze directed away from the observer prompts re-orienting of visuospatial attention towards the object of the gazed-at direction (e.g., Friesen and Kingstone, 1998; Driver et al., 1999; Hietanen, 1999; Langton and Bruce, 1999; for a comprehensive review, see Frischen et al., 2007). On the other hand, this article seeks to explore the effects of gaze direction on observers' affective responses—an area that has garnered comparatively less research attention in contrast to the more extensively studied domain of gaze direction's impact on attention.

In daily life, the interplay between gaze direction and affective responses is palpable. For instance, while addressing an audience, a direct gaze from any audience member may elicit feelings of comfort and reassurance, whereas an averted gaze from an individual during a social interaction may induce feelings of insecurity and discomfort. On the other hand, the experience of waiting alone at a bus stop at night, with someone observing, may evoke distress, whereas an averted gaze from that individual might provide a sense of relief.

The understanding of another's gaze is intricately associated to a variety of contextual factors, including antecedent, simultaneous, and predictable circumstances. The gazer's accompanying verbal and non-verbal cues—including facial expressions and verbal content—profoundly influence the meanings attributed to their gaze. Ellsworth and Carlsmith (1968) illustrated this phenomenon; participants interacting with an experimenter who maintained direct eye contact evaluated both the communication and the interviewer more favorably in a positive circumstance. In stark contrast, in a negative context, those in the averted gaze condition offered more favorable evaluations than those experiencing direct gaze. Given that many social encounters may be perceived as relatively neutral, therefore it is necessary to examine whether individuals' gaze direction can elicit affective reactions in observers within such contexts. Moreover, one must consider whether direct eye contact is experienced as more positively or unenthusiastically charged as compare to averted gaze in such cases.

According to Emery, 2000; Skuse, 2003, the perception of direct gaze is associated with eliciting protective behaviors and triggering responses indicative of threat or aggression in animals. Conversely, in humans, direct gaze often serves as a mechanism of control and has been correlated with attributes such as strength, domination, and control (Argyle et al., 1974; Hall et al., 2005), traits that can sometimes provoke negative emotional responses in others.

Nonetheless, humans possess a fundamental need for belonging and for forging and sustaining social correlations, with the approval of these needs intrinsically linked to positive outcomes (Maslow, 1943; Baumeister and Leary, 1995; Eisenberger et al., 2003). Given that another individual's direct gaze signals attention and social inclusion (Wirth et al., 2010), one may infer that such gaze would predominantly evoke positive affective responses.

In this article, I will conduct a comprehensive review of empirical research examining the impact of another individual's gaze direction on perceivers' affective responses. The focus will be on well-controlled laboratory experiments that have effectively minimized or eliminated contextual variables potentially influencing these affective reactions. This approach parallels methodologies employed in numerous studies over the past several decades that have investigated recognition and affective responses to human emotional expressions—whether conveyed through facial expressions, body movements, posture, or vocal prosody—by presenting meticulously prepared stimuli to participants.

Though the body of research exploring affective responses to gaze stimuli remains moderately incomplete, two salient themes emerge from this review. Primary, the affective reactions elicited by direct versus averted gaze often yield divergent, and at times, opposing results when assessed using explicit measures as compare to implied determines. Next, as explicit evaluations disclose considerable inconsistency, studies employing various forms of implicit measurement tend to reveal a more coherent pattern, suggesting that direct gaze generally elicits a more positive affective response than averted gaze.

In the ensuing sections, to begin with I will classify accessible study based on the methodologies utilized to review participants' emotional reactions. Subsequently, I will explore potential explanations for the affective impacts of eye contact. Finally, I will discuss the interplay between affective and concentration property of direct gaze, advocating for the integration of these affective responses into contemporary models that aim to characterize and elucidate a variety of types of “eye contact” or “watching eyes” incidences (cf. Senju and Johnson, 2009; Conty et al., 2016).

Obvious Emotional Responses Induced by Gaze Stimuli

Social psychological research has extensively explored how an individual’s gaze affects others' evaluations of their characteristics. While these studies often did not focus on emotional responses to gaze direction and frequently included uncontrolled variables, they set a crucial context for understanding gaze effects. Participants typically viewed films where the eye contact of individuals was manipulated. Following these presentations, they rated the individuals on traits such as likability and attractiveness. Findings generally indicated that individuals making eye contact received more favorable evaluations, with a positive correlation between the extent of eye contact and the evaluations.

Additionally, some studies utilized well-controlled facial stimuli, manipulating only gaze direction. Results consistently demonstrated that direct gaze yielded more positive evaluations than averted gaze, across both photographs of real individuals (Mason et al., 2005) and virtual avatars (Kuzmanovic et al., 2009). However, few studies have investigated participants' direct emotional responses to neutral faces with varying gaze directions, resulting in mixed findings. For instance, Wirth et al. (2010) found that participants who viewed averted gaze films reported more negative feelings compared to those who viewed direct gaze films, while gaze direction did not significantly influence their positive mood ratings.

A more recent study by Leng et al. (2018) assessed feelings of distress and exclusion through sequences of direct and averted gaze. Participants reported feeling more distressed and excluded when exposed to averted gaze. Nonetheless, these findings could have been influenced by participants’ prior evaluations of being looked at or ignored. Despite potential confounding factors, studies without preceding tasks have shown that static faces with direct gaze evoke more pleasant feelings compared to averted gaze. This effect has been observed with both human faces (Uono and Hietanen, 2015) and animated stimuli (Chen et al., 2017a).

Using Implicit Measures in Behavior Studies

Lawson (2015) conducted seven experiments using the Implicit Association Test (IAT) to assess implicit affective evaluations of direct and averted gaze. Participants categorized images of faces displaying either direct or averted gaze alongside affectively positive and negative words.

According to Greenwald et al., 2003; Nosek et al., 2005, a couple of response keys were utilized: in the “congruent” condition, participants pressed one key for faces looking at them or positive words, and the other key for faces looking away or negative words. The “incongruent” condition reversed these associations. Comparing categorization speeds in both conditions allowed for the investigation of implicit associations between gaze direction and word valence

Results indicated shorter categorization times in the congruent condition, demonstrating that participants associated direct gaze with positivity and averted gaze with negativity across varying presentations. Notably, this pattern held even for angry faces, contrasting with self- report findings, such as those by Marschner et al. (2015), which showed mixed effects based on emotional expression. Additionally, Lawson explored whether similar results would emerge with shapes or arrows labeled as “looking at you” versus “looking to the side.” Participants still favored “looking at you” stimuli, although the effect was less pronounced than with facial stimuli.

In the IAT study, task instructions emphasized gaze direction, prompting the concepts of “looking at you” and “looking to the side.” This raises the question of whether direct gaze would still elicit a positive association in tasks that do not draw attention to gaze direction. Dubey et al. (2015) employed the choose-a-movie (CAM) paradigm, where participants selected boxes leading to movie clips.

The direct gaze movies featured individuals looking at the camera, while the averted gaze films presented the same individuals appearing to look away. Participants demonstrated a greater willingness to watch direct gaze movies, indicating a preference for such social stimuli, which may reflect more positive affective responses. Similar behavior was assessed

in individuals with autism spectrum disorder (ASD), who showed a reduced preference for direct gaze. Chen et al. (2017a) further investigated automatic affective evaluations elicited by gaze direction using an affective priming paradigm.

Autonomic Stimulation the way to activate Amygdala

The key to emotional responses is the physiological arousal (Plutchik, 1980). Studies show increased sympathetic skin conductance responses (SCRs), a measure of arousal, when individuals experience direct gaze compared to averted gaze (Nichols & Champness, 1971; Hietanen et al., 2008). Pupil dilation also increases more in response to direct gaze (Porter et al., 2006). The amygdala, which regulates affective arousal (Mangina & Beuzeron-Mangina, 1996; LeDoux, 2000), has been linked to gaze direction processing. Imaging studies reveal greater amygdala activation when viewing direct versus averted gaze, even in cortically blind patients (Burra et al., 2013). While increased arousal and amygdala activation indicate an effective response, it's unclear if this is positive or negative. Recent findings suggest the amygdala is involved in both positive and negative affect (Hoffman et al., 2007).

Studies have produced conflicting results, showing greater activation for averted gaze (e.g., Straube et al., 2010). Despite these ambiguities, the amygdala is central to mediating arousal and directing attention to gaze. A neural pathway from the superior colliculus to the amygdala likely supports gaze processing (Senju & Johnson, 2009; Tamietto et al., 2012). Particularly, research on monkeys indicates that the lateral extended amygdala (LEA) responds more to averted gaze (Hoffman et al., 2007). On the other hand, human studies suggest the LEA is critical for arousal in response to direct gaze, highlighting the complexity of these affecting responses.

Unbalanced Frontal Cortical Activity

According to Davidson, 1984, 2004; Harmon-Jones, 2003, 2004; Harmon-Jones et al., 2006; Van Honk and Schutter, 2006, additional direct brain research evidence associating gaze direction with affective valence comes from studies reporting the effects of gaze direction on the activation of the brain systems implicated in the processing of affect and motivational states.

There is a considerable line of research associating asymmetric frontal alpha-band electroencephalographic (EEG) activity to emotional and motivational processes. The relatively greater activation of the left versus the right frontal cortex has been linked to positively valenced affect and activation of the approach-related motivational system, whereas the opposite pattern of frontal asymmetric activation has been linked to negative affect and activation of the avoidance system.

Most of this research has investigated the association between resting state frontal EEG activity, and trait affect and trait motivation, but other studies have examined asymmetric frontal EEG activity in response to affective and motivationally significant stimuli (for a review, see Harmon-Jones and Gable, 2018).

Few studies have shown that seeing another individual's gaze direction has an effect on observers' frontal EEG asymmetry. For instance, Hietanen and colleagues measured the hemispheric asymmetry in the frontal EEG activity in response to seeing another, live individual with direct and averted gaze (Hietanen et al., 2008; Pönkänen et al., 2011b). Findings revealed that seeing another individual's direct gaze elicited greater relative left-sided frontal EEG activity as compared to seeing averted gaze. These results provide evidence in favor of the fact that direct gaze elicits greater activation in brain mechanisms associated with approach motivation and positive affect as compared to averted gaze.

In fact, in Hietanen et al.'s (2008) study, another individual's averted gaze elicited right-sided, avoidance-related frontal EEG asymmetry. Interestingly, in their study, subjective ratings of affective valence were also measured, and they indicated that averted gaze was rated as slightly more pleasant as compared to direct gaze. Thus, in this study too, implicit (physiology) and explicit (self-rating) measures resulted in incongruent patterns of results.

The frontal EEG asymmetry response to gaze direction has been shown to be modulated by personality and neuro-psychiatric disorders. Uusberg et al. (2015) measured EEG asymmetry in response to a live individual's gaze in participants with varying degrees of neuroticism according to the Five Factor Model. The results showed that, in participants scoring low on neuroticism, direct gaze elicited greater left-sided frontal EEG asymmetry as compared to averted gaze, as observed in the two studies mentioned above. However, in participants scoring high on neuroticism, direct gaze elicited greater right-sided frontal EEG asymmetry as compared to averted gaze. In another study, the frontal EEG asymmetry response to gaze direction was investigated in adolescents with clinically diagnosed social anxiety disorder (Myllyneva et al., 2015).

The results showed marginally greater left-sided frontal EEG response to direct gaze in control participants as compared to the clinical group. ASD have also been shown to influence the frontal EEG asymmetry response to gaze. Kylliäinen et al. (2012) investigated children with ASD and control children, and showed that, in the control children, direct gaze elicited greater left- sided frontal asymmetry than closed eyes did; whereas, in ASD children, the gaze direction did not have an effect on frontal EEG asymmetry responses. These three studies indicate that the increased negativity to direct gaze associated with neuroticism, social anxiety, and autism (Campbell and Rushton, 1978; Senju and Johnson, 2009; Moukheiber et al., 2010) is reflected in the frontal EEG asymmetry responses.

Startle Reflex Modulation Simplified

The startle reflex is an automatic reaction to sudden, strong stimuli. Researchers often study this reflex by measuring eye blink responses or heart rate changes triggered by loud sounds Lang et al., 1990; Bradley et al., 1999; Grillon and Baas, 2003, Graham and Clifton, 1966; Graham, 1992; Holand et al., 1999; Richter et al., 2011).

According to Vrana et al., 1988; Bradley et al., 1993; Bradley and Lang, 2000; Ruiz-Padial et al., 2005; Roy et al., 2009; Sánchez et al., 2009; Ramírez et al., 2010; Richter et al., 2011, interesting results revealed that the emotional context of what we see at the same time can influence the strength of this reflex. For instance, our responses are stronger in unpleasant situations and weaker in pleasant ones.

A couple of studies explored how the direction of someone's gaze affects the startle reflex. In one study, men saw pictures of nude women with either direct or averted gaze while hearing loud noises (Lass-Hennemann et al., 2009). It was found that pleasant images decreased eye blink responses more when the gaze was averted compared to when it was direct. The researchers believed that direct gaze drew more attention to the faces, reducing the impact of the nude images. In a more recent study, participants faced a live model with either direct or downward gaze while loud sounds were played. Both eye blink and heart responses were recorded (Chen et al., 2017b).

The results showed that responses were weaker when the gaze was direct. Participants also rated their feelings while looking at the model, finding direct gaze slightly less positive than downward gaze, although the difference wasn't significant (e.g., Hietanen et al., 2008; Chen et al., 2017a).

Overall, these studies suggest that the direction of another person's gaze can trigger different emotional reactions, with averted gaze often promoting a more positive response than direct gaze.

Electromyography (EMG) of the Face

Based on Cacioppo et al., 1986; Tassinary and Cacioppo, 1992; Dimberg and Thunberg, 1998; Dimberg et al., 2000), EMG has been extensively

utilized to explore emotional expressions and automatic affective reactions. Research indicates that positive stimuli enhance the activity of the Zygomaticus major (responsible for smiling) while reducing the activity of the Corrugator supercilii (associated with frowning). Conversely, negative stimuli increase the activity of the Corrugator supercilii (Cacioppo et al., 1986; Larsen et al., 2003).

Schrammel et al., 2009; Rychlowska et al., 2012; Soussignan et al., 2013, suggested that gaze direction from the expressor modulates EMG responses, no significant effects were observed for neutral facial expressions. Also, Hietanen et al. (2018) hypothesized that this absence of effect could be attributed to the use of static images rather than live individuals. Their investigation employed a live model exhibiting varying gaze directions, with participants given the option to focus directly on the model or look slightly away.

Findings revealed that zygomatic responses were heightened in response to direct gaze, irrespective of the participant's gaze direction, with a more pronounced response occurring when participants maintained direct eye contact. These results imply that direct gaze in a neutral context can elicit positive affective reactions. Nonetheless, Hietanen et al. cautioned that it remains ambiguous whether observed facial reactions are purely automatic affective responses or whether they are influenced by social motivations during interpersonal interactions.

The Possible Potential Tools Beyond the Emotional Eye Gaze Results

This review emphasizes the conflicting findings between explicit and implicit measures regarding affective reactions to direct versus control-gaze stimuli. While explicit self-evaluations often show higher valence ratings for averted-gaze or closed-eye stimuli, implicit measures consistently indicate more positive reactions to direct gaze. These discrepancies may be attributed to motivational biases affecting explicit responses, as individuals often lack full awareness of their implicit emotions.

The correlation between explicit and implicit measures tends to strengthen with the spontaneity of self-reports (Hofmann et al., 2005). Research suggests that explicit and implicit processes can be complementary or oppositional (Frith & Frith, 2008). Direct gaze may evoke uncertainty about the gazer's intentions, heightening self-awareness (Hietanen & Hietanen, 2017) and potentially leading to negative self-evaluations (Duval & Wicklund, 1972). Thus, even initially positive responses to direct gaze can be mitigated by more controlled evaluations, reflecting the dual systems at play in socio-cognitive functions (Spunt & Lieberman, 2013; Vogeley, 2017).

The positive feelings we get from eye contact may come from the visual information we gather from the person's eyes. Accordingly, research shows that eye contact can automatically trigger positive feelings. But why does this happen? Here are four possible reasons. One explanation is that our reactions to eye contact come from how we perceive the eyes, which can be influenced by basic visual cues like brightness (Kobayashi and Kohshima, 1997; Langton et al., 2000; Ando, 2002). These visual signals are processed by certain brain pathways, including the amygdala. Senju and Johnson (2009) proposed a model where direct gaze is detected and processed by a quick subcortical pathway involving the superior colliculus, pulvinar, and amygdala. This pathway might influence other brain networks involved in social interactions and understanding others. In this way, it can also affect how we respond emotionally.

In addition, this article introduces the potential affective effects of gaze direction, grounded in humans' innate need for belonging and social relationships (Maslow, 1943; Baumeister & Leary, 1995; Eisenberger et al., 2003). It posits that direct gaze serves as a positive social signal, indicating attention and inclusion (Wirth et al., 2010). Thus, the impact of gaze may be more about the perception of others' attention rather than the visual cues themselves.

Empirical evidence supports this notion. For instance, studies found increased autonomic arousal and greater left-sided frontal EEG activity in response to direct gaze versus averted gaze when participants interacted with a live individual, but not with images (Hietanen et al., 2008; Pönkänen et al., 2011b). Myllyneva and Hietanen (2015) further demonstrated that participants showed greater skin conductance responses (SCRs) to direct gaze when they believed the model could see them, an effect that disappeared when they thought the model could not. In a follow-up experiment, the visibility of the model's eyes was manipulated using different sunglasses. Results indicated increased SCRs in response to direct gaze regardless of eye visibility, but the effect diminished when opaque sunglasses were worn by the model.

Moreover, the findings suggest that enhanced physiological responses to direct gaze from another individual stem from an awareness of being attended to, rather than merely the visual characteristics of eyes. One mechanism at play is the heightened self-directed attention that eye contact can trigger. Conty et al. (2016) posited that such interactions initiate a self -referential mode of information processing, which was supported by research showing that direct gaze increased the use of first-person pronouns (Hietanen and Hietanen, 2017). Additionally, positive emotional responses to eye contact may be mediated by self-reference effects.

Another perspective is that affective responses to gaze relate to the dynamics of interaction; research indicates that gaze patterns differ significantly between live individuals and images, emphasizing the role of bidirectional communication (Laidlaw et al., 2011; Risko et al., 2012; Wu et al., 2013). In Hietanen et al.'s (2018) study, participants displayed stronger zygomatic responses during direct gaze compared to averted gaze, reinforcing that the strongest affective responses occurred when participants recognized that they were seen. Furthermore, skin conductance responses revealed heightened arousal only when the observer actively engaged in direct gaze, showcasing that the emotional reaction to direct gaze relies on mutual acknowledgment of attention between individuals.

Furthermore, the research by Myllyneva and Hietanen (2015) indicates that the lack of effect from another individual's gaze direction—whether direct or averted—on affective arousal responses may arise not only from the participant's awareness of being unseen but also from their inability to convey, "I am looking at you." Although eye contact between two stationary individuals does not involve overt behavior, it nonetheless represents a coordinated and reciprocal interaction as defined by De Jaegher et al. (2010). This interaction involves both parties consciously directing their attention toward each other, fulfilling the essential characteristic of engagement. Schilbach and colleagues further emphasize the importance of interaction and emotional engagement in distinguishing genuine encounters from mere observations without the opportunity for interaction (Gangopadhyay & Schilbach, 2012; Schilbach et al., 2013).

Therefore, right now, it's hard to determine how important the different factors influencing the positive feelings from eye contact are. These factors include visual cues from a direct gaze, receiving attention from others, processing information about ourselves, and interaction. It's possible that their influence changes based on how we measure emotional reactions in studies. Future research should focus on understanding how each of these factors specifically affects different measures of emotional responses.

Images vs live Faces linked to study Of Emotional Eye Contact

An important consideration pertaining to the proposed mechanisms underlying the effects of affective eye contact warrants further examination. If these effects stem from the influence of receiving others' attention, interaction, self-referential processing, or a combination thereof, a critical question arises:

How are affective responses still observed in studies where participants are presented with images of faces that do not engage with or interact with the observer?

As previously suggested, one potential explanation is that the "belief of being watched" may constitute an intrinsic characteristic of direct gaze, deeply rooted in both human evolutionary history and the overlearning experiences of early childhood. This perspective posits that such beliefs are integral to our perception of direct gaze (Conty et al., 2016), which may elucidate why direct gaze in pictorial stimuli can also provoke automatic positive affective responses.

However, this raises an additional issue:

How can we account for findings from certain studies indicating that while the gaze direction of a live individual influences these emotional reactions, this effect is not replicated when participants view the same facial stimuli as images (e.g., Hietanen et al., 2008; Pönkänen et al., 2011b)?

Notably, this discrepancy is unlikely to arise from low-level differences in the stimuli employed in these investigations. For instance, both studies reporting similar outcomes (Lawson, 2015; Chen et al., 2017a) suggest that the nuances of social cue processing may vary significantly between live interactions and static images.

Research indicates that direct gaze in video clips does not enhance autonomic responses, unlike interactions with live models (Lyyra et al., 2018). Studies suggest that the belief that a model can see participants influences affective arousal (Myllyneva and Hietanen, 2015). Differences in findings may stem from the types of responses measured; studies showing no gaze effects with pictures focused on physiological responses, while those showing effects emphasized cognitive-affective associations. It's possible that perceiving a picture alters physiological responses via a top-down process, inhibiting reactions when real interaction isn't possible (Myllyneva and Hietanen, 2016).

Some conflicting research findings might be due to how people pay attention to different stimuli and the mental effort required during tasks. In studies where participants passively looked at images without any tasks, they didn't show strong emotional responses. This suggests their focus may have been on the computer setting rather than the images themselves. Conversely, when participants were given specific tasks to identify the emotional content of the images, they did show emotional responses, even when instructed to ignore the gaze direction in the images.

A study by Conty et al. (2010) tested this idea by combining gaze stimuli (like direct gaze and averted gaze) with either a challenging spelling task or an easier letter decision task. They found that when the task was difficult, participants showed stronger physiological responses (like skin conductance) to direct gaze compared to averted gaze or closed eyes. However, during the simpler task, there was no difference based on gaze direction. The researchers suggested that when cognitive load is low, our brain's inhibition of arousal responses might be stronger.

Discussion and Conclusion

This review highlights the importance of gaze perception in inferring another individual's attention. Research shows that direct gaze captures a perceiver's visual attention, influencing cognitive processing (Senju and Johnson, 2009; Conty et al., 2016). Evidence suggests that eye contact activates affective systems, contributing to various "eye contact effects" and "watching eyes effects." While Conty et al. (2016) indicated that eye contact enhances self-awareness and pro-social behavior through self-referential processing, the initiation of affective processes related to eye contact was not thoroughly addressed. Positive affect triggered by eye contact may enhance memory and evaluation of others, supported by literature on the effects of positive emotions on perception and behavior (Forgas and Bower, 1987; George, 1991; Ashby et al., 2002).

This research area has many intriguing questions to explore. Studies are beginning to show that eye contact can trigger positive feelings, which might enhance various social interactions. Positive emotions are known to improve performance on cognitive tasks, potentially by increasing dopamine levels in the brain. While extended eye contact might be distracting and lead people to look away to reduce mental strain, brief eye contact could boost positive feelings, improving cognitive performance and social interactions.

An interesting topic to consider is how eye contact might influence therapeutic outcomes through these positive reactions?

n psychotherapy, positive feelings are believed to help promote therapeutic change by improving cognitive flexibility (Fitzpatrick and Stalikas, 2008). Future research should look into specific aspects, like how physical presence affects the impact of eye contact on emotions. If being noticed by others or the opportunity for interaction leads to positive feelings, it's important to understand how physical presence contributes to this. We should also consider whether eye contact can generate positive feelings during video calls. Although everyday experiences suggest it might not work the same way, this could be due to technical issues, such as how the camera and screen are set up and delays in video transmission. Additionally, the growing field of robotics offers exciting possibilities for human interaction with robots. As technology advances, social robots are starting to appear in various settings. In the near future, we may engage not only with people but also with robots in our homes, workplaces, and other service areas, leading to new ways of understanding these interactions.

How do we feel towards robots, and can making eye contact with them create positive feelings like it does with other people? If eye contact with robots can indeed make us feel good, it could be helpful in improving people's well-being, especially for those who struggle with social connections, like those with psychological issues or physical challenges, as well as those experiencing loneliness. John Heron once said that the most basic way we connect with others is through eye contact. This review suggests that eye contact not only helps us connect intellectually but also brings about positive feelings.

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