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Human emotions projected onto androids: a manifestation of internal crisis—human–android interactions in "The Sand-Man" by E.T.A. Hoffmann as example

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Abstract
Machines, robots or androids are often associated with a lack of emotions. But in the literary imagination at the beginning of the nineteenth century, there was already a mechanical android which has been endowed with projected emotions. In "The Sand-Man" (1816), E.T.A. Hoffmann introduced an android to represent the modern individual crisis. In the human-android emotional interactions in this novella, Olimpia plays the roles of a reference, a mirror and a catalyst, through which the state of the protagonist Nathaniel's psyche, cognitive dissonance, and inner crisis manifest. The projection of human emotions onto androids leads to the manifestation of inner crises of humans. This is a common phenomenon in the human-android emotional interaction (HAEI) in Western android narratives. The HAEI is the most direct source of the uncanny atmosphere in "The Sand-Man."

Keywords Emotion · Android · E.T.A. Hoffmann · "The Sand-Man" · Pygmalionism

Humanoid automatons: the absence and emergence of emotions around 1800

There is a lot to be imagined inside the shell of a machine or android, such as emotion; intentionality and self-consciousness; the ability to think; rationality and the soul. The efforts to simulate or replicate human consciousness/rationality and emotions via technology long have been thwarted and therefore these two factors have become important markers of androids simply being replicas rather than real humans. The dichotomy between body and soul, as well as an analogy between the

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human body and machinery, have long been established throughout Western cultural tradition. The association of the android with the absence of reason can be traced back to Descartes' dualism of mind and body. In *Discourse on method* (1637), Descartes made a thought experiment about the difference between the human-like automatons and humans, and emphasized what makes a human being: the reason embodied in human language and actions (Descartes, 1988, pp. 32). From Descartes' perspective, the material body of a human can be regarded as a machine, but the human being as a whole should not be considered a machine due to the fundamental difference between human beings and machines (or animals). Although French physician La Mettrie believed the soul was attached to the human body, which lifted the machine-like body to a higher position, there was still a derogatory sliding in the sense of the figurativeness of machines around the year 1800 and in the nineteenth century, which was seen as "the collapse of vitality, creativity and individuality" (Meyer-Drawe, 1997, p. 731).

The eighteenth century witnessed the growing sophistication of automatic technology, during which skilled craftsmen, such as Pierre and Henri-Louis Jaquet-Droz, as well as Jacques de Vaucanson, vied to create mechanical devices that could imitate humans to write and even play instruments: an attempt to decrypt both human bodies and lives. That century became "the century of the mechanic or the age of the humanoid automaton" (Völker, 1976, pp. 368–369). The humanoid automaton then was not an industrial product, but rather a cultural one, a comprehensive cultural phenomenon that combined technology, court culture, philosophical thought, and literature. Viewed technically, Vaucanson's automaton, as technical expert Sean Gerrish puts it, "could not react to the world," but rather "followed simple, predefined sequences of steps" (2018, p. 6). In spite of this, humanoid automata were, in Jean Baudrillard's words, "the analogon of man," whose "technique is to submit everything to analogy and to the simulacrum-effect" (1993, p. 53). Therefore, this kind of automaton can be regarded as an android. This craze for humanoid automatons lays a foundation for the discussion of the image of androids and human-android interaction (abbreviated here as HAI) in literature in the period around 1800. The common argument that automatons are the embodiment of the technological optimism that existed before and around 1800, at a time when they soon grew popular in civil society and literary works. For instance, they appeared in essays of Jean Paul and a play of Heinrich Beck *The Chess Player, or: The Crank* (1797); their manifestation in E.T.A. Hoffmann's novels is especially noteworthy.

In the history of European culture, the concepts of "emotion" and "machines" or androids had long been defined by their mutual exclusion. Currently, the phenomenon of androids simulating human emotions still generates heated discussion on mass media. Although emotional AI or automatons possess great academic, applied and commercial value, they pose insurmountable challenges for technology, and therefore has not received widespread attention. But emotional AI or robots appear often in sci-fi works. The robot No. 5 in the film *Short Circuit* (1986) unexpectedly acquires emotions after a lightning strike, which is technologically unrealizable. An engineer in the film, who does not believe the robot can acquire emotions, is concerned that "it is a machine […] It doesn't get pissed off. It doesn't get happy, it doesn't get sad, it doesn't laugh at your jokes. It just runs programming" (TC:

16:34–42). In today's daily pragmatics, machines, robots or androids are also the representatives of emotional loss. In his book *The emotion machine*, Marvin Minsky, one of the pioneers of AI technology, suggests that there are two meanings in the answers to the question "why does someone think they are just a machine." One is "to have no intentions, goals, or emotions" (2006, p. 33). In TV Series *Friends* (Season 6, Episode 14), Monica shouts at Chandler "You robot," emphasizing that he is poor at expressing his feelings and he seldom cries.

These conceptions and traditions of machines and emotions emerge, following the discussion of machines and reason. The literature of the eighteenth century was characterized by a prominent impulse towards emotion. Through Sentimentalism, "Sturm und Drang," etc., the topic of emotions became increasingly important; and with the rise of literary anthropology, greater significance was attached to issues such as the human psyche and dreams in Western literature. The automaton in the eighteenth century was an early form of android. The word "automaton" means "self-driven" in Greek etymology, and refers to the automation of actions, rather than their thinking ability or spiritual activities. Although machinists had attempted to create automata which could act in line with social etiquette, for example, there were even automatons which imitated human's appearance and behavior (such as playing instruments and writing) and attempted to act socially (such as nodding and bowing)—in a sense, these could be viewed as social robots. But it was still difficult for people to connect androids with emotions before the nineteenth century. In Charlotte Brontë's 1847 novel, Jane Eyre made a nineteenth century feminist declaration to Rochester, "do you think I am an automaton?—a machine without feelings?" (1993, vol. 2, p. 17). Automatons lack reason in Descartes's eyes, and lack emotions in Jane Eyre's metaphor. For a long time, automatons, robots, etc. in reality and literature were human-imitating or human-like beings with deficits of human emotions. This kind of mindset is far from unreasonable, and it is also rational under the circumstances of current technological reality. Therefore, equipping the robot family with human emotions became an interesting storyline in fantasy or sci-fi. In his review of the novel "Moxon's Master" (1899), Rob Welch argues that "the inclusion of emotion into the equation of self-consciousness is the real groundbreaking contribution Bierce makes to the genre of science fiction" (2020, p. 122). To some extent, the chess player automaton in this novel has stimulating emotions, but the combination of machine and emotion emerged earlier, because in fantasy or sci-fi works, automatons, robots or androids could also be endowed with projected emotions.

Two types of android emotions: simulating or projected emotions

Based on the agent of emotions, this article considers that there are two kinds of emotions of machines, robots or androids. One is the "simulating emotion" of androids. It is essentially artificial emotion with technological support. In the realm of AI technology, simulating emotion is a topic of heated discussion: news about AI program being equipped with emotions or sentiments appear from time to time, but at the same time, some technical experts disagree with such opinions. There are also experts who think that "in the near future, some AI products or technological

equipment like emotional androids might be taken by part of the public as a third kind being—neither a person nor a thing, but at the same time both a person and a thing" (Chen, 2020, p. 86). Whether the technology is explained in detail in a literary work or not, simulating emotion theoretically comes from the technical settings, including aspects such as programs or algorithms—that is, androids obtain emotions due to technical logic or possibility. For instance, this happens to David in the American movie *AI* (2000), Samantha in the American movie *Her* (2013) and Tom in the German film *I Am Your Man* (2021). As the technological possibilities grow stronger, there is a growing presentation of such kind of simulating emotion in contemporary sci-fi works. This means androids in sci-fi works have the potential for emotions, sometimes they might experience richer emotions than humans—that make them more human than a human. With the burgeoning of social androids, emotion plays an increasingly important role in HRI (Human–robot interaction). However, the emotions of machines are not necessarily equipped with intelligent technologies.

Another kind is the "projected emotion" or "endowed emotion" of machines which stems from human emotions. Projected emotion, in fact, is independent from technological interpretability or feasibility, and it only exists in human desire and imagination in HRI or human–android emotional interaction (abbreviated here as HAEI). Projected emotion has long appeared in fantasy and sci-fi. There is a strong case in point in E.T.A. Hoffmann's masterpiece "The Sand-Man" (1816), where the protagonist Nathanael perceives the lifeless automaton Olimpia as a human being with emotions. Examples of humanoid machines or objects with projected emotion can often be attributed to male fantasy. In Goethe's early play *The Triumph of Sensitivity* (1777), the protagonist Oronaro endows a human-like doll with spiritual and emotional resonance, which serves as the only being that he could communicate with. This kind of HRI or HAI is, to some extent, communication between man and himself. Long before the corresponding technology grew mature, there were many examples of projected emotions in literature. As I formulated elsewhere: "If love could be seen as a projection of narcissism, then it is particularly evident in the love with dolls or androids" (Cheng, 2019, p. 25). By projecting his feelings onto automatons or androids, those who project their emotions outward maintain their comfort zone in HAI. This kind of projected emotion in human imagination does not start with robots or androids, but it is particularly common in contemporary robots or android stories. In fact, it seems inevitable that humans will project their emotions onto human-like objects. Maciej Musiał holds the idea that "it would be surprising if people would not animate, anthropomorphize, and emotionally attach to androids and treat them as intimate partners, since they have done that with far less sophisticated inanimate objects for centuries" (2019, p. 15).

These two kinds of machine emotions intersect occasionally. A human being could and would project his/her emotions onto an android that is able to simulate emotions, for instance, the way Dr. Stuber treats his "hubot" partner Chloé in the film *I Am Your Man*. In this article I am going to explore projected emotions and HAEI in "The Sand-Man." Research on this masterpiece by E.T.A. Hoffmann is definitely not rare, but it is still necessary to reread it from the perspective of projected emotion and HAEI, especially against the growing significance of HAEI. Distinct

from the "soul," "emotion" is not yet the most notable keyword in "The Sand-Man," but the issue of android emotion and HAEI remains an unneglected aspect of the storyline, for the story only moves towards its climax with the help of HAEI. Moreover, it has a decisive influence on the aesthetic atmosphere of the text. E.T.A. Hoffmann tends to put androids in a position between having and not having reason and emotion in order to test their impact on the human psyche. By rereading "The Sand-Man" with the emotions of the android Olimpia and HAEI as keywords, it is possible to reconsider the issues of human crisis, uncanny aesthetics and Pygmalionism evoked by HAEI.

The "projected emotions" of androids in "The Sand-Man"

Olimpia in "The Sand-Man" is considered to be "the most well-known image of an artificial female in literary history" (Drux, 1988, p. 119), having a direct impact on the relevant literary and artistic images of later generations. More than a hundred years before "robot" became a concept, the image of Olimpia had been introduced to the readers. Read within the context of its time, when "The Sand-Man" was written, Olimpia is, to be more exact, a humanoid automaton, yet she looks and behaves in a very human-like way. Therefore, academia uses also the term "android." Unlike industrial robots or other non-realistic robots, androids such as Olimpia can play the role of a human double, substitute, or even partner. Therefore, such androids are the most likely to give rise to people's instinctive aesthetic and psychological fluctuations among all machines, and the most likely to cause humans to project their feelings. In the novella, what kind of emotions does Olympia have? These issues will be analyzed from the following three perspectives, with a focus on the respective viewpoints of Nathanael, Siegmund, and the narrator.

Nathanael's perceptions of Olimpia are not immutable. When he first saw her, he considered her as having "a strangely fixed look about her eyes" and it seems that she had "no power of vision," "sleeping with her eyes open," which caused him to be "quite uncomfortable" (Hoffmann, 1967, p. 194). Reading one's soul from the eyes was not a unique notion during that time period. But around 1800, visual perception was indeed viewed as the most important and trustworthy of all sensory perceptions. At that time, people believed that "a person's temperament and emotional states could be seen through the eyes" (Drux, 1994, p. 145). Eyes, eyesight and visions were important criteria for distinguishing "organic and spiritual things from inorganic and dead things" (Drux, 1994, p. 23). When Nathanael met Olimpia for the second time, his impression towards her did not change: "he remained perfectly unaffected by Olimpia's stiffness and apathy" (Hoffmann, 1967, p. 202).

The use of magical telescopes became the turning point of his perception. In the age of enlightenment, the telescope was the fruit, as well as a symbol of technological progress, which significantly changed the way and scope how people saw the outer world and caused anxieties simultaneously. In "The Sand-Man," the telescope inherits viciousness from Coppola, the Doppelgänger of the devil Coppelius. Seen from the telescope, Olimpia began to change from "having a singular look of fixity and lifelessness" to having eyes with "a light like humid moonbeams came

into them," and it "seemed as if their power of vision was now being enkindled" (Hoffmann, 1967, p. 203). Olimpia in Nathanael's eyes is now changing from an "idiot" who disturbed him to a "glorious, noble star of love" (Hoffmann, 1967, p. 204). Although he sometimes sensed that Olimpia's lips and hands were "as cold as ice" and "he shook with and awful, frosty shiver" (Hoffmann, 1967, p. 206), when he looked at her blankly, he also found that "her eyes were shining, full of love and longing to look at him"; at this time, "her glance was beaming upon him with love and longing, and at the same moment he thought that the pulse began to beat in her cold hand, and the warm life-blood to course through her veins" (Hoffmann, 1967, p. 206). It can be seen that Olimpia is originally a cold machine, unable to simulate emotions. Her "emotions" come directly from the transmission of Nathanael's warm body and his emotional projection, and then, the dead machine seems alive like the sculpture of Pygmalion. After the failure of human-human interaction with Clara, the human-android communication becomes effective. The "Emotion" of the silent, passive and obedient Olimpia has now become a sanctuary for Nathanael's own existence. In response to Nathanael's deep emotions, Olimpia just replies mechanically "ah! ah! ah!," but this is interpreted by Nathanael as the most affectionate response. Rational readers will view this communication as just the singular projection of eerie emotions, but in the pure spiritual world created by Nathanael, it appears as mutual communication: the only successful communication of intimate emotion. Just as Darko Suvin said, "Olimpia is only seen [living] by a dizzy observer" (1979, p. 132). The image of Olimpia is no longer an objective image in his mind, but the ideal image he creates for himself. Nathanael was unable to overcome the cognitive dissonance caused by the demons in his fantasy. Finally, he firmly believed that Olimpia had a soul and emotion, and could resonate with him.

In the story of Nathanael and Olimpia, Siegmund's views represent the views of other characters. Siegmund calls Olimpia "Miss Wax-face" and "wooden doll" (Hoffmann, 1967, p. 208) and tells Nathanael how he thinks about Olimpia:

> She is singularly statuesque and soulless. Her figure is regular, and so are her features, that can't be gainsaid; and if her eyes were not so utterly devoid of life, I may say, of the power of vision, she might pass for a beauty […] We felt quite afraid of this Olimpia, and did not like to have anything to do with her; she seemed to us to be only acting like a living creature, and as if there was some secret at the bottom of it all (Hoffmann, 1967, p. 208).

But Nathanael believed that Siegmund thought this way because he [and other people] were "cold prosaic fellows" (Hoffmann, 1967, p. 208). Nathanael once shared Siegmund and others' views on Olimpia. But so far, the good friends who were once very close have gone into separate ways.

The narrator offers sometimes very ambiguous information, but holds generally a similar view to Siegmund's. In the narrator's words, Nathanael's fiancé Clara "had the powerful fancy of a bright, innocent, unaffected child, a woman's deep and sympathetic heart, and an understanding clear, sharp, and discriminating" (Hoffmann, 1967, p. 197), while Olimpia "sang as skillfully an aria di bravura, in a voice which was, if anything, almost too brilliant, but clear as glass bells" (Hoffmann, 1967, p. 205). There is a striking difference between Clara and Olimpia. Clara, "die Klare" in

German, represents rationality and clarity, while Olimpia represents darkness, mysteriousness and death, and is connected with the other uncanny artificial creatures in German Dark Romanticism, such as the animated marble statue (Kremer, 1999, p. 83).

On the issues of the nature of Olimpia, Nathanael is on a completely different channel from other characters and the narrator. By endowing the android with soul and emotions, Nathanael establishes the response and satisfaction both in emotion and the pursuit of art. By bonding with her emotionally, he creates an exclusive comfortable zone or "virtual reality," a reality that other people cannot share.

Human crisis and the uncanny atmosphere in HAEI

In the short story "Die Automate" (1814), Hoffmann intimates that the music created by automatons would be incapable of truly transmitting human emotions. But in "The Sand-Man," Hoffmann makes another literary gesture. Humanoid automatons, symbolizing enlightenment, reason and the technological advances of the eighteenth century, are put by E.T.A. Hoffmann into the daily scenario and endowed with projected emotions of a dark, agnostic, mysterious, and uncanny nature. Meanwhile, the spiritual existence and internal crisis of Nathanael emerge clearly in the HAEI. It can be seen that Olimpia's emotions are purely projected by Nathanael. In the private spiritual world constructed by Olimpia and him, androids in their "interactions" with human may play three roles.

First: the reference of human emotions. In the literary and cinematic imagination, it is quite common to use the emotions of androids to contrast against the ruthless and emotionless states of humans. Nevertheless, there is a slight difference in the case of Olimpia. She does not have emotion in a real sense; instead, she is empowered with emotion by Nathanael, who suffers from cognitive distortion. He believes that Clara and Siegmund are so apathetic, compared to Olimpia, who will always be obedient to him. What Nathanael needs is an automaton that replies automatically and never refuses anything, which cannot be satisfied by the rational Clara, who is unwillingly obedient to Nathanael. Therefore, Clara is even degraded as a "damned lifeless automaton!" (Hoffmann, 1967, p. 200), which, ironically, is Olimpia's very nature.

Second: the mirror of human psychological state. Nathanael thinks, "only in her love can I find my own self again" (Hoffmann, 1967, p. 208). It can be seen that the so-called "emotions" of the android are merely the place where Nathanael's narcissism is placed. His romantic love for Olimpia is ultimately a kind of narcissism. As a mirror for Nathanael, Olimpia's emotion reflects his Self, as when he said to Olimpia, "what a profound soul you have! my whole being is mirrored in it!" (Hoffmann, 1967, p. 206). For readers, this reflects also Nathanael's cognitive distortion and inner crisis.

Third: the catalyst of human's crisis. Before Nathanael meets Olimpia, he already suffers from hallucinations and delusions originally caused by his childhood nightmares. In romances between humans and artificial man, the latter plays "transhuman-sexual partner," "object of sexual desires," "medium of sexual

domination," "the chosen partner for emotional interaction," "the substitute for real human," "artificial being with factitious beauty and elegance," "living angel," or "virtual partner" (Cheng, 2019, pp. 23–25)—Olimpia is the "chosen one" and the "living angel" for Nathanael, further making his crisis emerge during HAEI. E.T.A. Hoffmann was interested in the technologies of automata. However, his primary interest was "the psychological consequences of the breakdown of the distinction between the animate and the inanimate" (Kang, 2011, p. 207). Writing poetry or expressing love to Olimpia are Nathanael's attempts to heal himself. Here, Olimpia's "emotions" and "response" become a catalyst for exposing Nathanael's two kinds of crisis: firstly, it is his cognitive disorder, which can be traced back to his childhood nightmares and fears. He is so deeply influenced by his fear of the Sand-Man that in adulthood, he fails to grasp his own destiny. Nathanael's existence is held in a strange and devilish hand. Secondly, it is the narcissism and existential crisis of Nathanael with a "tempest-tossed soul" (Hoffmann, 1967, p. 214). In this state of psyche, Nathanael falls in love with the silent lover, who is yet exactly the automaton he hates.

In HAI, the android plays three roles, from which Nathanael gains a sense of existential safety and builds up his defense mechanism, but at the same time his crises manifest themselves. Experts in the technological realm think that HRI has similar functions. "From a psychological perspective, HRI offers the unique opportunity to study human affect, cognition, and behavior when confronted with social agents other than humans" (Bartneck, et al., 2020, p. 9).

As a result of Nathanael's projection of emotions onto Olimpia, not only Olimpia herself, but also HAEI creates an uncanny atmosphere between the lines. In early discussions about the phenomena of the uncanny, "The Sand-Man" is a highly significant case, and Olimpia plays a core role in the debate between Jentsch and Freud. In "Zur Psychologie des Unheimlichen" (1906), Jentsch points out that the most disturbing situation is "der Zweifel an der Beseelung eines anscheinend lebendigen Wesens und umgekehrt darüber, ob ein lebloser Gegenstand nicht etwa beseelt sei" (Jentsch, 1906, p. 197). For humanoid artificial men (such as automata), "Je feiner der Mechanismus und je naturgetreuer die gestaltliche Nachbildung wird, um so stärker wird auch die besondere Wirkung zu Tage treten" (Jentsch, 1906, p. 203), He also considered that in Hoffmann's narratives, the uncanny feeling caused by such an automaton is more obvious, since readers do not have the opportunity to immediately learn the truth that Olimpia is actually a dead machine (Jentsch, 1906, p. 203). In "The uncanny" (1919), Freud does admit that the highly human-like automaton might cause uncanny feelings. But he does not consider that as the most important factor in "The Sand-Man" since he attaches more importance to Nathanael's nightmares and their alienated return, while Olimpia only plays a secondary role (Freud, 1955, pp. 238–242). Now we pay more attention to the issue of HRI, which Freud and Jentsch might be accused of neglect, especially from today's perspective. Olimpia is disturbing and uncanny, but so are Nathanael's crisis and his "emotion interactions" with Olimpia. Nathanael still regards this dead machine as a "living angel" and even whole-heartedly whispers his earnest affection in her ear. This scene narrated by Hoffmann is so vivid that readers can imagine a disturbing human-android emotional interactive space:

> All at once it seemed to Nathanael, albeit he was far away in a different world, as if it were growing perceptibly darker down below at professor Spallanzani's. He looked about him, and to his great alarm became aware that there were only two lights left burning in the hall, and they were on the point of going out. […] He bent down to her mouth, but ice-cold lips met his burning ones. As he touched her cold hand, he felt his heart thrill with awe; the legend of "The Dead Bride" shot suddenly through his mind. But Olimpia had drawn him closer to her, and the kiss appeared to warm her lips into vitality.
> "Do you love me? Do you love me, Olimpia? Only one little word—do you love me?" whispered Nathanael, but she only sighed, "Ah! Ah!" as she rose to her feet (Hoffmann, 1967, pp. 207–208).

Such "emotional interactions" are a game played by the narcissist Nathanael. The HAEI is not the origin of Nathanael's existential state and inner crisis, but its catalyst and manifestation. It can be seen from HAEI that Nathanael is no longer the master of his own soul and he cannot feel at home in the mundane world. Eventually, he stakes his affection and his very existence on a dead machine. That the reason why "The Sand-Man" could become the masterpiece of uncanny aesthetics cannot simply be the automaton by Jentsch, the "Sand-man" or the childhood nightmares emphasized by Freud, but the synthetical effect caused by all these factors plus the uneasy HAEI and the human crisis within it.

The new mode of HAI and HAEI in the post-pygmalionism era

In today's discussion of androids and emotions, "The Sand-Man" is a work that has not yet been paid sufficient attention to. In the discussions of projecting emotions onto androids and HAEI, the android plays the roles of a reference point, a mirror, and a catalyst, making Nathanael's cognitive dissonance, psychological split, existential crisis, and "tempest-tossed soul" manifest themselves. Around 1800, a transitional period filled with different kinds of thoughts and marking the beginning of a new era, automatons and androids that were originally "symbols of rational order of the classical Enlightenment" (Kang, 2011, p. 187) are endowed with mysterious and shadowy attributes in the works of the German Dark Romanticism. In its reflection on technology, rationality, and enlightenment, the topic of HAEI, which still seems very new today, had already emerged in "The Sand-Man." This seems accidental, but if we put this phenomenon in the historical context of the time, it is not surprising. In the new discoveries of the human in the literary anthropology around 1800 and in his explorations of human psyche, disposition and emotions, E.T.A. Hoffmann explores the potential of android as human double, mirror, and the uncanny other for the presentation of human crisis.

In interpreting the gender dimension of the Western android motif, German scholar Rudolf Drux proposes the "male dream"-"[artificial] female body" model, in which the female android (body) is interpreted as the crystallization of the male dream (2006, p. 21). I would like to complement that model with the HAI-mode of human emotions projected onto androids as a manifestation of internal crisis

based on the human-android romance in "The Sand-Man," in which Nathanael projects his emotions onto the android, leading to his crisis manifesting in HAEI. This is a further step on the former mode, with which it often intersects; the latter mode emphasizes HAEI in the process and highlights human crisis in its consequences. It is worth discussing in depth how androids, including human-like dolls with similar functions, can embody the existential state or inner crisis of human beings, what kind of impact they can have on human beings, and how we should view such phenomena. A study of early androids in Western narratives and HAI can help clarify the lineage of related narrative traditions. Nathanael's romanticized, idealized, and free choice in who he loves—viewing the android as his only option that best suits his state of psyche—and the disturbing scene in which he whispers his affection to the inanimate automaton are images of HAEI that transcend time. It is not uncommon to see similar topics in contemporary literature and film. Examples from German literature and film include Kurt Münzer's novella "Pygmalion" (1920), Ferdinand von Schirach's novella "Lydia" (2018), the movie *I Am Your Man*.

In literature and film after "The Sand-Man," human-android romance often represents the existential and emotional crisis of humans in modern society. Compared to the sculptures come to life, traditional dolls, and marionettes, the discussion of Olimpia is still highly relevant and serves as a pivot linking the above traditions with contemporary artificial humans in a broad sense. In myths, legends, and literature, the case that humans are in an intimate relationship with sculptures and traditional dolls, has continued for at least two millennia; the phenomenon of human-machine romance today is a growing trend. In the last two hundred years, mechanical and intelligent androids, silicone dolls, cyborgs and digital humans are frequently projected with emotions or they start to simulate emotions. Along with the time pass, this phenomenon is becoming increasingly post-human. Today, the phenomena of "human emotions projected onto androids (robots): a manifestation of internal crisis" remains valid for interpreting human-android or human-robot interactions or romances in sci-fi works and even in reality.

In the early psychology of sexuality from the latter half of the nineteenth century to the early twentieth century, researchers tended to view erotic relationships between humans and humanoid artifacts (especially human-like sculptures, mechanical dolls, sex dolls, etc.) as psycho-sexual disorders. Inspired by the Pygmalion myth, the fledgling psycho-sexual community adopted the concept of Pygmalionism. For example, the German scholar Iwan Bloch noted that Pygmalionism is an "imitation of the old saga of Pygmalion and Galatea and exploitation of the same for erotic purposes" (1908, p. 710). This view or the use of this concept was also held by scholars such as Georg Merzbach and Havelock Ellis. At that time, scholars emphasized the pathological dimension of Pygmalionism (similar to today's "Agalmatophilia"), but Pygmalionism is now often defined as "the tendency to fall in love with one's own creations" (Sutherland, 1989, p. 359). To examine the HAI in "The Sand-Man," "Pygmalion," and related contemporary literary and cinematic works through the perspective of the psychology of sexuality around 1900, it seems that Pygmalionism is more or less present in the protagonists, who are unable to fall in love with humans and, therefore, project their emotions onto dolls or androids.

In contrast to the discussion of psychology of sexuality at that time, these literary and film works feature less direct discussion of sexuality and pathological disorders and show another facet of Pygmalionism. Both the projected emotions of Nathanael and Olimpia in "The Sand-Man" and the following literary stories, do not aim to define android love as sexual deviance, but rather to present the human crises hidden in HAEI. Through the Pygmalionian human–android relationship, the human crisis has different manifestations in different times: in the era of paradigm shift around 1800, "The Sand-Man" presents a terrible situation where the protagonist is swayed by irrational and strange forces and unable to be the master of his own soul and consciousness; in the era of individual crisis with pessimistic overtones in the early twentieth century, "Pygmalion" embodies the delicate nerves of the male protagonist and his lonely existence in a secular life; in contemporary literature, films, and reality, HAEI can "reflect the symptoms of contemporary individual and sexual anxiety" and testify to "the transformation of emotional perceptions" (Cheng, 2019, p. 29). HAEI in literature and film should not be viewed simply as sexual deviance, as it may have been seen in the early psychology of sexuality around 1900, but as manifestations of modern individual crises. As time ebbs and flows, the term Pygmalionism, in a more tolerant and pluralistic context, is undergoing three changes: first, its connotations are dwindling. This differs from Bloch's extensive interpretation, but is limited to the dichotomy between Pygmalion and his creation; second, it is becoming an outdated concept, no longer playing the paradigmatic role in today's literature as it did in the period around 1900; third, it has been going through a depathologized process, which is particularly evident in contemporary literature and film. In the Swedish sci-fi TV series *Real Humans* (2012–2014), the young man Tobias' love for the "hubot" Mimi is characterized by the doctor as "transhuman-sexual," and his father has a tolerant attitude towards this preference of his son. In "Lydia," Meyerbeck, abandoned by his wife, orders a doll lover and spends much happy time with it. But his neighbor insultingly damages his "lover" Lydia and writes "pervers sow" (Schirach, 2018, p. 65) in lipstick on his living room table. But it is clear that the focus of "Lydia" and similar works is neither to reveal whether a lonely individual is a "pervert," nor to propose psychological or sociological solution, but rather the situation, loneliness and crisis of individuals or outsiders—as the police in the novel says, Meyerbeck "is not mentally ill; he's just a lonely man" (Schirach, 2018, p. 67). As the psychiatrist puts it, "being in love with dolls, is somewhat outlandish, but not dangerous." (Schirach, 2018, p. 68).

However, in today's "post-Pygmalionism era," HAEI and its impact on human beings are complex issues that require dialectical consideration in an interdisciplinary context. The depathologization of Pygmalionianism is a concern for the individual, but from a non-literary or cinematic perspective, one tends to discuss positive values, especially in the case where Nathanael's Olimpia is not a companion with uniqueness, but rather a reproducible desire fulfiller, as in the film *I Am Your Man*. Based on the interaction with the android Tom and the case of Dr. Stuber's coddling of Chloé, Alma "strongly advises against authorizing humanoids as life partners" (TC: 01:39:37–39:45), because "it's to be expected that anyone who lives with a humanoid long term, will become incapable of sustaining normal human contact" (TC: 01:39:26–39:36). In her view, the android partner technology is one of

the "supposed improvements whose dire consequences only become clear decades or even centuries later" (TC:01: 36:55–37:05). There is a dilemma on the issue of how to view HAEI, as the overall consideration of human interests may overlook the needs of the individual: the emotional attachment to androids that Alma rejects is the very "android therapy" that Dr. Stuber finds for himself; the key question here is no longer whether Dr. Stuber can maintain interpersonal contact, for he has in fact been a loser in interpersonal relationships. This means that the attachment to Chloé does not destroy his normal interpersonal contact, because it is the only possible compensation. Nathanael and Meyerbeck are in a similar situation. Emotional attachment to a machine might not be able to cure Nathanael's "tempest-tossed soul," but it can give him quasi-interpersonal interactions; to some extent, Olimpia is his "tree hole," an outlet for his emotions, desires and crises.

Despite Alma's views, literature and film on the topic of android love tend to show sympathy towards individuals and their crises, while psychologists focus on diagnostics and offer solutions, and sociologists and philosophers of technology aim at pursuing positive values, giving universal advices and analyzing ethical risks such as the objectification of females, the inauthenticity of machine emotions, the alienation of emotional dependence, etc. But the related ethical discussion is again inundated with arguments, and scholars such as David Levy, Kathleen Richardson, Robert Sparrow, John Sullins and many others have taken part in the endless debate in recent years. The literary presentation of projected emotions on machines and human crises, even though it may offer an uncanny picture, could be an inspiration to psychologists, sociologists, and philosophers, especially in terms of both an understanding of individual crises and the complexity of this topic.

In his analysis of Asimov's robot novels, Adam Roberts has pointed out that "at root all the android stories are ethical fictions" (Roberts, 2006, p. 199). But ethics is not the only key factor in android science fiction; "emotion" is another key word, and emotion often leads to ethical problems. In the post-Pygmalionism era, the discussion of HAEI, as well as the related human crises and ethical issues (both in the individual and social sense), deserve to be examined in a broader context. As mentioned above, android and android emotions are interdisciplinary topics of great academic value, and the exchanges of different disciplines can help us better understand this phenomenon. In this process, the emphasis on the individual and its crisis in literature and film as represented by "The Sand-Man" can bring irreplaceable inspiration to the relevant discussions.

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