Humor as a Cognitive Construct: Predictors of Production, Styles, and Comprehension
Macy Brill

Abstract

Humor is a cognitively and emotionally complex behavior that integrates core psychological processes. This review synthesizes findings across three domains, humor production, humor style, and humor comprehension, to examine how creativity, general intelligence, executive functioning, working memory, and emotional intelligence contribute to humor ability. While creativity and verbal fluency are consistently implicated across all domains, other mechanisms show domain-specific roles. For example, executive functioning and emotional intelligence are particularly relevant to humor styles, while working memory and general intelligence support comprehension and production. Gaps remain in understanding executive processes in comprehension and emotional intelligence in production. By comparing mechanisms across domains, this review advances an integrated model of humor and identifies key areas for future research and application.

Introduction:

Humor is a cognitively demanding and socially embedded behavior that draws upon a range of core mental faculties. Recent research has aimed to pinpoint the specific mental processes and individual differences that shape humor abilities, shedding light on how creativity, intelligence, executive functioning, and emotional skills predict various aspects of humor behavior.

This review examines three interconnected domains of humor research, specifically humor production, humor style, and humor comprehension, with an emphasis on the cognitive and emotional mechanisms that support them. In humor production, abilities such as verbal intelligence (the capacity for language-based reasoning and word retrieval), general intelligence (which includes abstract reasoning, problem-solving, and integrative thinking), divergent thinking (i.e., the ability to generate multiple, varied ideas in response to open-ended prompts), and cognitive flexibility (i.e., the capacity to shift perspectives and adapt thinking to new or changing situations) enable individuals to generate original and context-sensitive humorous content. These processes are distinct from humor recall or stored humor knowledge, which refers to culturally or socially learned jokes and comedic references. Instead, generative humor tasks, such as those involving joke completion and cartoon captioning, measure real-time creativity and verbal construction.

Humor styles, defined as how individuals tend to use humor in everyday life, reflect emotional and interpersonal goals. These goals can be affiliative (i.e., to build social bonds), self-enhancing (i.e., for coping), aggressive (i.e., to tease or ridicule), and self-defeating styles (i.e., to disparage oneself, often to gain social approval or deflect criticism). The use of these styles is shaped by executive functions, such as inhibition and planning, as well as working memory and emotional intelligence. Individual differences in these characteristics can impact individuals' ability to deploy adaptive humor (i.e., humor that promotes well-being, social connection, and emotional resilience) versus maladaptive humor (i.e., humor that undermines well-being, reinforces negative emotions, or damages relationships).

Humor comprehension, meanwhile, draws on several interrelated cognitive abilities, including language processing (i.e., the ability to understand and interpret spoken or written language), semantic integration (i.e., the process of combining individual words and ideas into coherent meaning), and working memory (i.e., the mental capacity to temporarily hold and manipulate information). Together, these skills allow individuals to manage multiple possible interpretations across time, especially when encountering ambiguous or surprising content. Tasks like joke reasoning assess a person's ability to infer unstated meanings (i.e., implications not directly expressed) or to resolve unexpected punchlines (i.e., endings that conflict with the listener's initial expectations). Successful comprehension often requires suppressing one's first interpretation and re-evaluating the context to make sense of layered or delayed resolutions, abilities that may be particularly challenging for individuals with verbal impairments (i.e., difficulties in using or understanding language) or affective disorders (i.e., mood-related conditions such as depression or anxiety).

This paper provides a comprehensive overview of the predictors and processes underlying humor, emphasizing the complexity of its cognitive and emotional foundations. Understanding these mechanisms can inform both theoretical models of humor and practical applications in education, therapy, and communication.

Section 1: Cognitive and Emotional Mechanisms Underlying Humor Production

1.1. Verbal Ability and Humor Production

Verbal fluency and expressive flexibility are consistently associated with improved humor production. Research shows that individuals who produce effective verbal humor are not just skilled at language use but also at retrieving and manipulating verbal information in real time to generate novel and context-sensitive content. Success in verbal humor tasks correlates more strongly with verbal intelligence than with humor recall or memorized knowledge. For example, verbal intelligence, rather than humor knowledge, predicts performance on joke-reasoning tasks, suggesting that humor generation depends on real-time language construction rather than recalling pre-learned content (Feingold & Mazzella, 1991). Similarly, participants in joke-completion tasks demonstrated higher levels of both verbal intelligence and creativity compared to those in humor recall tasks, reinforcing the idea that humor production involves the generation of original language rather than recalling previously encountered jokes (O'Quin & Derks, 1997).

Verbal humor also depends on how effectively individuals retrieve and apply stored knowledge. Humor ability is best predicted by broad retrieval ability and general intelligence, rather than abstract reasoning capacity (Nusbaum et al., 2016), emphasizing the value of accessible language networks over analytic reasoning. Social language use strengthens this ability further. Individuals who frequently use humor in everyday conversation tend to interpret social cues more accurately and adjust their language to fit the situation, as shown in Merolla's (2006) study on verbal expressiveness in interpersonal communication. Likewise, intuitive and expressive personality traits appear to shape how verbal fluency translates into humor, suggesting that humor production benefits from both verbal ability and adaptive communication style (McCutcheon, 2003).

This connection between verbal ability and humor is evident even in tasks with visual components. In a study on Turkish children, higher verbal intelligence was associated with better humor performance in creating humorous captions for cartoons, suggesting that language-based reasoning supports humor creation regardless of the modality of the task (Arslan, Sak, & Atesgoz, 2021). Taken together, these findings indicate that verbal humor production reflects a unique blend of language fluency, contextual awareness, and expressive adaptability, underpinned by verbal intelligence and expanded through flexible social communication.

1.2. General Intelligence and Humor Production

Humor production relies heavily on general intelligence. As a complex cognitive task, generating humor requires individuals to coordinate multiple mental processes efficiently, like retrieving relevant information, selecting among competing ideas, and producing a coherent and

original response. These demands align directly with the core components of general intelligence. Evidence consistently shows that individuals with higher levels of general intelligence are more successful in humor production tasks. General intelligence has been shown to predict humor ability, independent of verbal skills or personality traits (Howrigan & MacDonald, 2008). This indicates that the capacity to organize, manage, and integrate information may play a central role in humor creation, above and beyond expressive style or social tendencies.

Individuals scoring higher on general intelligence measures also tend to perform better on humor production tasks. In one such study, participants completed a cartoon-captioning task in which they had just one minute to generate a humorous caption for each cartoon — a setup that required them to rapidly generate, evaluate, and select from multiple competing ideas. This timed structure reflects the kind of cognitive juggling and fluency that underlies general intelligence, reinforcing the view that humor creation depends on efficiently managing multiple ideas under real-time constraints (Greengross & Miller, 2011).

Further support for the link between general intelligence and humor production comes from tasks involving layered or ambiguous material. In one study, participants engaged with complex humor that required them to inhibit initial, literal interpretations and shift toward more abstract or incongruent meanings. After this engagement, they performed better on unrelated insight problems, which similarly demand cognitive flexibility, pattern recognition, and representational change. These findings suggest that the mental operations involved in complex humor, such as generating abstract connections and suppressing default interpretations, overlap with the high-level cognitive processes central to abstract reasoning (Zhou et al., 2021). Collectively, these studies point to a clear conclusion: humor production is supported by the integrative, organizational, and problem-solving abilities that define general intelligence. It is not simply about being funny or expressive but about drawing on one's full range of intellectual resources to produce something clever, relevant, and original.

1.3. Joke Quality and Creation Time

Research suggests that humor production is shaped not only by what individuals think but also by how quickly and fluently they can access and elaborate on ideas, highlighting the importance of processing speed in generating humorous content. Several studies examined how time constraints, attentional resources, and cognitive pacing influence the quality and nature of humor production. For example, participants who were given longer time windows to generate humorous responses (e.g., 10 seconds instead of 5) produced more creative and original outputs, likely due to the activation of associative processes and the inhibition of more obvious, less novel ideas (Sun et al., 2022). This finding highlights a speed-elaboration trade-off in humor generation. Similarly, funnier jokes, judged by external raters, tended to take longer to produce, suggesting that deeper cognitive elaboration is required to craft effective humor (Silvia et al., 2024). However, participants rated their quicker responses as funnier, indicating a disconnect between perceived and actual joke quality. This metacognitive mismatch implies that individuals often underestimate the value of elaborative processing in humor creation.

Research has emphasized that sustained attention and conceptual elaboration play a key role in producing effective humor. Humorous content has been shown to prolong gaze duration in visual tasks, reflecting enhanced cognitive engagement and encoding (Strick et al., 2009). The time spent elaborating on a humorous idea also matters. In a study on pun comprehension and production, the duration and depth of conceptual elaboration, meaning the mental expansion and refinement of a humorous idea, were linked to increased humor appreciation (Boylan, 2018). These findings highlight the multifaceted relationship between joke quality and the time taken to generate it. While rapid access may support confidence or fluency, humor that resonates most with others often arises from more extended cognitive elaboration and mental restructuring.

1.4. Creativity and Humor Production

Generating humor often requires the ability to form unexpected connections, reinterpret familiar ideas, and introduce novelty in ways that are socially appropriate and cognitively engaging. These qualities are central to creative thinking, particularly in the form of divergent thinking and flexible idea generation. Individuals who demonstrate higher creative fluency, typically measured through tasks requiring the rapid generation of multiple novel ideas, tend to produce humor that is rated as more original and effective. For example, Kellner and Benedek (2017) found that participants who scored higher on divergent thinking tasks, such as generating alternative uses for common objects, also produced more humorous and inventive responses when asked to generate punchlines or caption cartoons. This suggests a strong connection between fluency, flexibility, and originality in both creativity and humor generation. Similarly, in a comparative study of humor quality predictors, Nusbaum et al. (2016) showed that creative potential, assessed using open-ended problem-solving tasks, predicted humor quality more strongly than did general intelligence, emphasizing that humor relies more heavily on exploratory cognition than on logical reasoning or rote recall.

This creative process becomes even more evident when humor is used to transform emotionally charged or threatening material. In one study, individuals who could generate humorous reinterpretations of negative scenarios, requiring both emotional and cognitive reframing, produced humor of greater quantity and quality (Papousek et al., 2019). This finding suggests that elaborating humor under conditions of emotional complexity demands not only flexibility but also a high degree of creative engagement to resolve internal conflict in original, lighthearted ways.

While creative potential often predicts humor quality, evidence also suggests a bidirectional relationship: structured training in humor production has been found to enhance creative thinking. For example, interventions designed to foster humor through guided practice increased both the originality and relevance of students' responses, implying that humor may serve not only as an expression of creativity but also as a tool for cultivating it (Gnevek, Musijchuk, & Musiichuk, 2018). Studies in early development further highlight the role of creative exploration in humor. Structured creative activities, such as storytelling and drawing, have been shown to increase both the quantity and originality of preschoolers' humorous expressions, demonstrating how playful exploration supports early humor development (Loizou & Loizou, n.d.). These findings demonstrate that humor

production is not simply a display of quick wit but a structured form of creative cognition. Whether expressed through words or visuals, producing humor involves the same mental processes used in imaginative play, divergent thinking, and artistic problem-solving, underscoring the deep roots of humor in the creative mind.

Section 2: Cognitive and Emotional Mechanisms Underlying Humor Styles

2.1. Executive Function and Humor Styles

Humor styles, or individual patterns in how people express and use humor, are closely linked to core executive functions. These functions support the regulation and strategic deployment of humor in social settings. Rather than reflecting a singular trait, humor styles vary widely across individuals, with cognitive control shaping whether humor is used constructively or maladaptively.Research indicates that positive humor styles such as *affiliative humor*, which fosters social bonds through inclusive, light-hearted jokes, and *self-enhancing humor*, which involves maintaining a humorous outlook during stress, are associated with stronger executive functioning. These styles promote emotional regulation and social connection. In contrast, negative humor styles like *aggressive humor* (mocking or manipulating others) and *self-defeating humor* (putting oneself down for approval) are linked to deficits in planning, impulse control, and self-monitoring. As Kruger (2016) found, positive humor aligns with traits like empathy and motivation, while negative humor reflects poorer behavioral regulation, suggesting that adaptive humor use depends on cognitive and emotional control.

The connection between executive function and humor use is also evident in terms of how inhibition can impact one's efficacy in punchline generation tasks. Individuals who were better able to inhibit dominant responses, meaning that they resisted the initial, most obvious punchline ideas and shifted between alternative interpretations, tended to select more effective punchlines. This demonstrates how executive control processes like inhibition and cognitive flexibility directly support humor style expression by allowing for more refined and socially attuned joke construction (Sun, Zhou, & Cropley, 2024). While the study examines punchline generation, it underscores cognitive processes that also underlie humor style use in real-world settings, suggesting a shared foundation for both structured humor and spontaneous social expression. Altogether, these findings suggest that humor styles are not just reflections of personality but are shaped by executive-level cognitive control. The way individuals use humor, whether to connect, deflect, self-enhance, or provoke, relies on their ability to monitor, adapt, and regulate their thoughts and behaviors in real time.

2.2. Emotional Intelligence and Humor Styles

Humor styles are shaped not only by cognitive control but also by emotional intelligence, which is the ability to perceive, understand, regulate, and express emotions effectively. Emotional intelligence influences both the intent and impact of humor, determining whether it is used to build connection, diffuse tension, mask vulnerability, or assert dominance. Individuals with higher emotional intelligence are more likely to adopt adaptive humor styles, while those with lower emotional insight may lean toward humor that is divisive or self-undermining.

Positive humor styles, such as affiliative and self-enhancing humor, are closely tied to higher levels of emotional intelligence. Individuals with strong emotional regulation and empathy are more likely to use humor to connect with others and cope constructively with stress. For example, someone using self-enhancing humor might laugh at a personal mishap, like spilling coffee on themselves before a big meeting, to maintain a light-hearted perspective and reduce tension. Trait emotional intelligence has been shown to predict increased life satisfaction and positive affect, with self-enhancing humor partially mediating this relationship (Wang, Zou, Zhang, & Hou, 2019). Conversely, individuals with higher emotional intelligence also tend to experience fewer negative emotions, such as anxiety or sadness, and this link is partially explained by reduced use of self-deprecating humor, which involves putting oneself down to gain approval or avoid judgment. While both styles may appear to serve coping functions, self-enhancing humor supports resilience, whereas self-deprecating humor often reflects underlying insecurity and can reinforce negative self-perceptions.

Emotional intelligence also plays a role in distinguishing humor appreciation across different styles and tones. For instance, appreciation of dark or aggressive humor has been linked to higher emotional detachment, lower empathy, and higher levels of mood disturbance (Willinger et al., 2017). These findings suggest that appreciation of darker humor may reflect a more emotionally detached or cognitively driven response to humor, rather than one rooted in interpersonal sensitivity. While this may facilitate the enjoyment of boundary-pushing content, it may also signal reduced emotional regulation or empathy in some individuals. Adaptive humor use also aligns with broader emotional competence in interpersonal situations. Individuals with stronger emotional awareness and regulation skills tend to use humor to enhance relationships and maintain self-esteem, while those lower in emotional perception are more likely to rely on humor that alienates or self-deprecates (Yip & Martin, 2006). Similarly, individuals with higher emotional intelligence demonstrate stronger alignment with affiliative and self-enhancing humor styles, using them to build rapport and manage stress in socially constructive ways (Rastogi, 2023).

Some researchers have proposed broader models that incorporate both cognitive and emotional components of humor use. The concept of humor intelligence, for example, integrates one's ability to produce and perceive humor - it has been suggested that individuals high in this form of intelligence can anticipate their audience's emotional reactions to humor and tailor their style accordingly (Schweitzer, 2023). This reinforces the idea that humor style is not only a reflection of personality but a form of emotional decision-making. In summary, the relationship between emotional intelligence and humor style underscores how emotional insight influences the ways individuals connect, protect, and express themselves through humor. Whether used to strengthen bonds or deflect discomfort, humor is often a tool for emotional navigation, and its effectiveness depends on the precision of that navigation.

2.3. Working Memory and Humor Styles

Understanding the cognitive foundations of humor requires examining not only how people generate or appreciate jokes, but also how they manage the mental demands of real-time social interaction. One cognitive capacity that appears especially relevant to humor style is working memory: the ability to hold, update, and manipulate information in mind.

Because humor often involves reading subtle cues, adjusting to audience reactions, and managing emotional tone, individuals with stronger working memory may be better equipped to deploy humor in socially strategic ways. This subsection explores how variations in working memory capacity relate to differences in humor style, with particular attention to affiliative and self-defeating forms of humor that require balancing self-expression with interpersonal sensitivity. Limited work has been done on this topic, leading to a paucity in research reviewed in this paper.

Working memory plays a significant role in humor styles. Young adults who scored higher on affiliative and self-defeating humor also demonstrated greater working memory capacity, suggesting that individuals may rely on the ability to actively hold and manipulate relevant personal and social information, such as audience expectations, emotional tone, and self-presentation goals, when constructing socially appropriate or self-targeted jokes (Priya, 2024). This capacity helps explain why self-defeating humor, while often seen as maladaptive, may sometimes reflect a more strategic and self-aware form of social communication.

2.4 Language Processing and Humor Styles

While humor styles are often discussed in terms of personality and emotional regulation, they are equally rooted in how individuals use and process language. Humor relies on the ability to manage meaning, recognize incongruity, and navigate social cues in discourse—all of which are fundamentally linguistic skills. Understanding how humor styles are expressed and interpreted through language offers important insight into the communicative strategies people use to achieve humor in everyday interaction.

Research in linguistics underscores the idea that humor is not just a personal trait but a socially embedded act shaped by language and context. Humor in conversation often serves distinct interpersonal goals; some speakers use it to build closeness and affirm group identity, while others use it to criticize, exclude, or mask discomfort (Attardo, 2020). These pragmatic functions closely align with humor styles such as affiliative, self-enhancing, aggressive, and self-defeating. For instance, affiliative humor relies on inclusive, cooperative language to foster connection, whereas aggressive humor tends to use sarcasm or teasing to assert dominance or create distance. Self-defeating humor, meanwhile, may appear playful but can reflect deeper patterns of self-disparagement in speech. As linguistic analysis has shown, humor is often co-constructed between speakers and listeners through shared conversational norms, cues, and mutual understanding. This highlights how humor styles are not just expressed cognitively but are enacted through dynamic patterns of discourse and interaction.

Research on humorous discourse structure has shown that the interpretive demands of different humor styles such as tracking meaning shifts, revising assumptions, and recognizing incongruity, place unique burdens on the listener's language processing abilities, particularly in terms of semantic mapping and pragmatic interpretation (Graesser & Mandler, 1988). While the structural complexity of humor styles like aggressive or self-defeating humor suggests a need for greater linguistic flexibility, empirical research directly linking verbal comprehension or language processing ability to specific humor styles remains limited. However, given that humor styles are enacted through discourse,

and that successful use often depends on timing, nuance, and narrative manipulation, it is likely that individuals with stronger verbal or pragmatic skills are better able to flexibly deploy a range of humor styles in socially appropriate ways.

Together, these findings reinforce the idea that humor styles are not just static personality traits but dynamic strategies embedded in language. Whether humor is used to build connection, assert social boundaries, or navigate discomfort, its effectiveness depends on how it is linguistically constructed and interpreted. The relationship between language processing and humor styles reveals that the way people comprehend and express humor is shaped by both their cognitive tendencies and their habitual ways of engaging with others through discourse. As such, understanding humor requires attention not only to what is funny, but also to how and why it is communicated.

2.5. Creativity and Humor Styles

Humor and creativity share a common foundation in flexible thinking, mental play, and the ability to generate novel connections. Both involve breaking conventional patterns, whether in thought, language, or expression, and reassembling them in surprising ways. As such, individual differences in creativity may influence not only the capacity to produce humor, but also the particular style in which it is expressed. Exploring the relationship between creativity and humor styles provides insight into how imaginative thinking shapes the ways people engage with humor socially and psychologically.

Creative thinking may be best supported not by rigid adherence to a single humor style, but by the flexible use of multiple styles depending on context. In a study using a typological approach, Chang et al. (2015) found that adolescents who endorsed a broad mix of humor styles, including both adaptive and maladaptive forms, demonstrated significantly higher levels of creative potential and creative attitudes than those who relied solely on positive humor. These "general humor endorsers" outperformed other groups, suggesting that cognitive flexibility and comfort with diverse forms of expression may facilitate more inventive thinking. Rather than viewing aggressive or self-defeating humor as inherently limiting, this research suggests that the creative mind may draw on a wider emotional and stylistic repertoire, using humor as a flexible tool for exploration, disruption, and reinterpretation.

The relationship between humor styles and creativity is not only evident at the individual level but also shaped by the broader environment in which individuals work. In a study of 362 university academics in Turkey, Kocak (2018) found that self-enhancing and affiliative humor styles were positively associated with creativity, while aggressive humor showed a negative relationship. Interestingly, self-defeating humor did not significantly predict creativity, suggesting that not all non-adaptive humor styles uniformly constrain innovation. The study also found that when academics felt their university encouraged innovation, the positive effects of adaptive humor styles on creativity were even stronger. These findings highlight that humor's creative potential depends not only on personal style but also on organizational context, underscoring the role of both individual differences and situational cues in shaping creative expression.

Although much research has shown that creativity influences humor styles, the relationship may in fact be bidirectional, with humor styles also shaping creative thinking. Experimental evidence supports this possibility, particularly in the domain of divergent thinking. In two studies, Akben and Coşkun (2024) examined how exposure to different humor styles, specifically self-enhancing and self-defeating, affected participants' creative performance. Participants who viewed humorous cartoons reflecting self-enhancing humor performed better on alternative uses tasks than those in a control group, suggesting that exposure to adaptive humor can prime flexible, generative thinking. Interestingly, the impact of self-defeating humor was more variable, influenced by personality traits such as extraversion. For some individuals, this form of humor may promote creative ideation by encouraging cognitive play and emotional openness, while for others it may hinder performance. These findings suggest that humor's effect on creativity is not uniform, but rather interacts with dispositional factors to either facilitate or constrain divergent thinking. Taken together, the study underscores the importance of examining not just how creativity shapes humor style, but how humor style may actively support or limit creative cognitive processes depending on the individual.

These studies illustrate that creativity and humor styles are deeply intertwined, shaped by both internal traits and external conditions. While adaptive humor styles, such as a like self-enhancing orand affiliative style, often promote creative thinking, the most robust creative outcomes appear to stem from individuals who can fluidly engage with a diverse range of humor styles depending on context. Cognitive flexibility, personality traits, and the surrounding social environment all influence how humor is used as a tool for imaginative expression. Ultimately, humor styles are not just reflections of personality or mood but can serve as flexible strategies for navigating complexity, generating ideas, and expressing creativity in both personal and professional domains.

Section 3: Cognitive and Emotional Mechanisms Underlying Humor Comprehension

3.1. Language Processing and Humor Comprehension

Humor comprehension is a linguistically demanding process that relies on recognizing incongruity, drawing inferences, and integrating contextual cues. These skills depend not only on general language ability but also on how efficiently individuals process semantic, syntactic, and pragmatic information in real time. Differences in cognitive ability influence how deeply and accurately individuals comprehend humor. Children with higher verbal IQs demonstrate a stronger appreciation for jokes that contain surprising or mismatched elements—scenarios that initially violate expectations but are ultimately resolved in clever or coherent ways. This suggests that language-based reasoning supports both the interpretation of humor and the emotional experience of amusement (Pinderhughes & Zigler, 1985).

Language proficiency also plays a critical role, particularly for bilingual individuals. Interpreting humor in a second language often requires more effortful semantic integration and syntactic processing, which can lead to slower and less accurate responses. This added

cognitive load reflects the linguistic complexity of humor and underscores the challenges of navigating humor across languages (Chan, Chou, & Lin, 2017). Together, these findings highlight that humor comprehension is underpinned by verbal intelligence, linguistic processing efficiency, and the cognitive flexibility needed to reconcile ambiguity. Unlike humor production, which emphasizes generative fluency, comprehension relies more on the ability to interpret and integrate layered linguistic information in real time.

3.2. Working Memory and Humor Comprehension

Humor comprehension also relies on working memory, which is the ability to hold and manipulate multiple mental representations over short periods of time. Resolving incongruity, interpreting double meanings, and making pragmatic inferences all place a substantial load on this system. Theoretical work suggests that humor comprehension frequently requires suppressing literal interpretations and shifting between possible meanings– tasks that fall under executive control mechanisms. Working memory allows individuals to hold an ambiguous sentence in mind, test different meanings, and evaluate which resolution is most coherent or amusing (Gibson, 2020). Without adequate capacity, this integrative process breaks down, particularly when jokes involve complex or nested structures. Empirically, this has been proven, as when individuals are asked to comprehend jokes under cognitively demanding conditions, performance declines. In dual-task settings, participants who needed to retain other information while processing humor showed significantly reduced joke comprehension, demonstrating that working memory resources are essential for resolving competing interpretations and mapping the punchline onto prior context (Moran, Campbell, & Rowe, 2003).

Humor often involves layered meanings or punchlines that require a shift in interpretation, and individuals with greater working memory capacity are more successful at identifying and resolving these subtleties. Studies show that people who can hold multiple possible meanings in mind at once tend to recognize and appreciate humor more effectively, especially when the shift in meaning is subtle or delayed (Martin & Dobbin, 1999). Similarly, those with stronger working memory skills show greater sensitivity to the timing and structure of punchlines. When jokes rely on subtle shifts in context or meaning, individuals with higher working memory capacity are better able to track the progression of a joke and extract the intended interpretation (Chang, Lin, & Lee, 2018). This skill is particularly important in multi-sentence jokes, puns, or jokes with misleading setups. These findings underscore the essential role of working memory in humor comprehension. While language processing enables individuals to access and understand words and phrases, working memory makes it possible to manipulate, suspend, and reconcile meanings across time: a critical requirement for interpreting humorous material.

3.3. General Intelligence and Humor Comprehension

General intelligence, including both fluid and crystallized cognitive abilities, plays a central role in humor comprehension. This includes the capacity to efficiently process information, draw inferences, and apply stored semantic knowledge when interpreting jokes or humorous stimuli.

Evidence from developmental and experimental studies highlights how general intelligence affects humor understanding across populations. For example, eye-tracking data from children with varying cognitive profiles revealed that gifted children displayed deeper and more targeted visual attention when interpreting cartoon jokes, suggesting more efficient allocation of cognitive resources and enhanced integration of visual and semantic information (Havlíčková & Ivánková, 2017). These attention patterns reflect fluid intelligence, particularly in how efficiently information is processed and updated in real time. Similarly, research comparing children with and without intellectual and developmental disabilities found that while humor production was relatively stable across groups, humor comprehension and sensitivity to incongruity differed significantly (Short et al., 1991). These differences point to the critical role of general cognitive abilities, especially abstract reasoning and inferential processing, in decoding humorous content.

Age-related shifts in humor comprehension further reinforce this relationship. Older adults tend to rely more on crystallized intelligence, accumulated semantic knowledge, rather than flexible, real-time processing. Chan and Lavallee (2015) found that while this reliance supports understanding of familiar joke formats, it may limit comprehension of novel or unconventional humor that demands more cognitive flexibility. These findings underscore how changes in general intelligence across the lifespan affect humor processing and interpretation. Taken together, this research suggests that general intelligence, whether reflected in real-time processing efficiency, developmental cognitive profiles, or accumulated knowledge, plays an essential role in the successful comprehension of humor.

3.4. Creativity and Humor Comprehension

Understanding the connection between creativity and humor comprehension provides deeper insight into how individuals process incongruity: a key element of humor. Wu and Chen (2019) examined this relationship by testing how three dimensions of cognitive creativity, divergent thinking, insight, and remote association, related to the comprehension of incongruity-resolution and nonsense humor. Their findings revealed that individuals with stronger remote associative skills were better at understanding incongruity-based humor, while those with higher insight abilities showed better comprehension of nonsense humor, which lacks logical resolution. These results suggest that different forms of humor rely on distinct cognitive processes and that creative abilities enable individuals to flexibly interpret and resolve humorous material. The study reinforces the idea that humor comprehension is not merely a linguistic or emotional act, but also a complex form of creative cognition.

Humor comprehension, like creativity, involves the ability to recognize, interpret, and resolve unexpected or incongruent information. Evidence suggests that individuals who exhibit high levels of divergent thinking, a core component of creativity, are better equipped to process humorous material, particularly when it involves surprise or abstract associations. This is because understanding humor often requires a flexible mental shift: detecting an incongruity, holding multiple interpretations in mind, and reinterpreting the setup in light of an unexpected punchline. As noted in foundational work connecting humor to creativity, the act of "getting a joke" mirrors the problem-solving processes used in creative thinking. Increased exposure to humor has also been shown to enhance creative performance, further supporting the idea that

humor and creativity mutually reinforce one another. Both rely not only on cognitive ability but on imaginative play, emotional engagement, and the willingness to explore unconventional interpretations.

Evidence also suggests that exposure to humor can temporarily enhance the cognitive processes involved in humor comprehension. In an experimental study, Ziv (1976) demonstrated that adolescents who listened to a humorous audio recording prior to completing a creativity task performed significantly better than control groups who did not. The humor stimulus was carefully selected for its strong laughter response, indicating high engagement and emotional activation. These findings suggest that humor does more than amuse; it can prime the mind for more flexible, divergent thinking, which is essential to both creativity and humor comprehension. By stimulating cognitive openness and increasing mental receptivity to incongruity, humorous input may support the interpretive work required to understand layered or unexpected meanings in jokes and narratives.

Together, these studies emphasize that humor comprehension is not a passive act of recognition but an active form of cognitive engagement shaped by creative capacities. Whether through remote association, insight, or divergent thinking, creativity equips individuals with the tools to navigate ambiguity, reinterpret meaning, and resolve incongruity—skills central to understanding complex humor. Moreover, the cognitive effects of humor exposure itself suggest that comprehension can be enhanced in real time by engaging with amusing content, priming the brain for the flexible thinking it requires. These findings position humor comprehension at the intersection of creativity, cognition, and emotional responsiveness, highlighting its value as both a marker of cognitive flexibility and a potential catalyst for it.

Conclusion:

Humor is a cognitively rich and emotionally guided behavior that engages overlapping but distinct mental faculties across humor production, style, and comprehension. All three domains draw upon creativity and verbal ability as core supports, but differ in their reliance on specific emotional and cognitive mechanisms. For example, humor production and comprehension both engage general intelligence and working memory, whereasile humor styles uniquely rely on executive functioning and emotional intelligence. Language processing is central to both humor comprehension and style, but manifests differently across tasks. Notably, executive functioning has not been studied in relation to humor comprehension, marking a key gap in the literature. Together, these distinctions reveal how humor offers a powerful window into higher-order cognition, while also underscoring the need for more integrative, comparative research across domains.

Creativity is a central mechanism across all three domains, but its role appears to differ in function and directionality across domains. In humor production, divergent thinking and conceptual flexibility allow individuals to generate original, surprising content, especially in tasks like joke completion and cartoon captioning. In humor comprehension, creativity supports the resolution of incongruity and the reinterpretation of ambiguous meanings, particularly through remote association and insight. Humor styles, in contrast, benefit from flexible engagement with different humor types, suggesting that dispositional creativity influences how people use humor

socially. Experimental research even suggests that exposure to humor styles can shape creative output, indicating a likely bidirectional relationship that warrants deeper investigation.

General intelligence also plays a robust role in humor, but appears to act more as a unidirectional mechanism than a mutually reinforcing trait. In humor production, general intelligence supports idea integration, problem-solving, and time-sensitive elaboration. In humor comprehension, it facilitates the integration of abstract meanings and suppression of literal interpretations, particularly in layered or incongruent joke structures. However, general intelligence has not been explicitly studied in relation to humor styles, despite its relevance to cognitive control, which has shown to relate to humor styles. Future work should assess whether general intelligence supports flexible style use, or whether style preferences operate independently of broad intellectual capacity.

Executive functioning emerges as a strong predictor of both humor production and humor style, but is conspicuously absent in humor comprehension research. In humor production, skills like inhibition and cognitive flexibility support the suppression of obvious punchlines in favor of more refined alternatives. In humor styles, executive functioning regulates whether humor is deployed constructively (e.g., affiliative) or maladaptively (e.g., aggressive or self-defeating), reflecting control over one's emotional and social impulses. Despite this, little work has explored how executive processes support real-time humor comprehension, where inhibition and perspective shifting are likely essential. Filling this gap could clarify how executive control contributes to not only what people find funny, but also how they process complex or conflicting meanings.

Emotional intelligence plays a significant role in humor styles, shaping both the intent and interpretation of humor in interpersonal contexts. Individuals high in emotional intelligence tend to favor affiliative and self-enhancing humor, which promotes connection and resilience. Conversely, those low in emotional intelligence are more likely to engage in aggressive or self-defeating humor, which may reflect poor emotion regulation or low self-awareness. While emotional intelligence has not been directly linked to humor production or comprehension, its role in guiding expressive tone and social goals suggests it may indirectly influence how humor is generated and received. Future studies should explore whether emotionally intelligent individuals also demonstrate enhanced humor comprehension or production, especially in socially embedded settings.

Working memory is recruited across all domains but has been studied most extensively in comprehension. In humor comprehension, it allows for the retention and manipulation of multiple interpretations, particularly when resolving layered or delayed punchlines. Humor production also draws on working memory, particularly when individuals must manage content, tone, and audience expectations in real time, though this link remains underexplored. Humor styles may similarly rely on working memory to manage nuanced self-expression or audience tailoring, particularly for affiliative and self-defeating humor. However, more targeted research is needed to assess these mechanisms directly, especially in real-world contexts where humor is generated spontaneously.

Language and verbal ability are foundational to humor in every domain, though they manifest differently depending on task demands. In humor production, verbal fluency and

expressiveness support the creative generation of humorous content, particularly in verbal or caption-based tasks. In humor comprehension, language ability facilitates semantic integration and pragmatic inference, enabling individuals to resolve incongruity. Humor styles, while often treated as emotional or personality-driven, also rely on linguistic framing such as tone, irony, or narrative structure to achieve different social goals. Despite this, the direct relationship between language processing ability and humor style remains understudied. Clarifying how verbal ability supports stylistic flexibility could deepen our understanding of how humor operates as a communicative tool.

In conclusion, the mechanisms underlying humor are both shared and distinct across production, style, and comprehension. Creativity and verbal ability span all three, while general intelligence and working memory are more prominent in production and comprehension. Emotional intelligence and executive functioning, by contrast, shape how humor is deployed as a social strategy through style. Some mechanisms, such as general intelligence, act as unidirectional cognitive supports, whereas others, like creativity, may be mutually reinforcing, shaping and being shaped by humor use. Addressing under-researched areas, particularly the role of executive functioning in humor comprehension and the linguistic foundations of humor styles, will help build a more complete model of humor as a cognitive and emotional system. As humor research continues to evolve, cross-domain comparisons and ecologically valid methods will be essential to fully capturing its complexity and relevance.

Acknowledgments
I would like to acknowledge my mentor Ellie Xu. Without your support and guidance, I would not have been able to complete this paper.

Declaration of conflict of interests
The author(s) declare that there are no conflicts of interest regarding the publication of this article.

References

1. Arslan, D., Sak, U., & Atesgoz, N. N. (2021). Are more humorous children more intelligent? A case from Turkish culture. *Humor - International Journal of Humor Research*, *34*(4), 567–588. https://doi.org/10.1515/humor-2021-0054
2. Feingold, A., & Mazzella, R. (1991). Psychometric intelligence and verbal humor ability. *Personality and Individual Differences*, *12*(5), 427–435. https://doi.org/10.1016/0191-8869(91)90060-o
3. Gnevek, O., Musijchuk, M., & Musiichuk, S. (2018, October 3). *Humor as a means for developing student creativity*. https://www.revistaespacios.com/a18v39n40/18394021.html
4. H.J Kruger, G. (2016). Executive Functions and Humor Styles: A Canonical Correlation Analysis. *Conference*. https://doi.org/10.13140/RG.2.2.33847.16806
5. Howrigan, D. P., & MacDonald, K. B. (2008). Humor as a mental fitness indicator. *Evolutionary Psychology*, *6*(4). https://doi.org/10.1177/147470490800600411
6. Kozbelt, A., & Nishioka, K. (2010). Humor comprehension, humor production, and insight: An exploratory study. *Humor - International Journal of Humor Research*, *23*(3). https://doi.org/10.1515/humr.2010.017
7. Loizou, E., & Loizou, E. K. (n.d.). *Visual and Verbal Humor Productions after a Series of Creative Structured Activities: A Case Study of Two Pre-Schoolers.* https://eric.ed.gov/?q=teaching+children&ff1=asmTorrance+Tests+of+Creative+Thinking&id=EJ1353137#:~:text=test%29,two%20children%20in%20their%20drawings
8. McCutcheon, L. E. (Ed.). (2003). North American Journal of Psychology [Collected Works]. *North American Journal of Psychology*, 330. https://files.eric.ed.gov/fulltext/ED477547.pdf#page=36
9. Merolla, A. J. (2006). Decoding ability and humor production. *Communication Quarterly*, *54*(2), 175–189. https://doi.org/10.1080/01463370600650886
10. Nusbaum, E. C., Silvia, P. J., & Beaty, R. E. (2016). Ha ha? Assessing individual differences in humor production ability. *Psychology of Aesthetics Creativity and the Arts*, *11*(2), 231–241. https://doi.org/10.1037/aca0000086
11. Papousek, I., Rominger, C., Weiss, E. M., Perchtold, C. M., Fink, A., & Feyaerts, K. (2019). Humor creation during efforts to find humorous cognitive reappraisals of threatening situations. *Current Psychology*, *42*(19), 16176–16190. https://doi.org/10.1007/s12144-019-00296-9
12. Pedrazzini, A., Bugallo, L., Zinkgräf, C., & Scheuer, N. (2020). Adolescents creating cartoons: A developmental study of humor. *Humor - International Journal of Humor Research*, *34*(1), 41–68. https://doi.org/10.1515/humor-2019-0022
13. Pinderhughes, E. E., & Zigler, E. (1985). Cognitive and motivational determinants of children's humor responses. *Journal of Research in Personality*, *19*(2), 185–196. https://doi.org/10.1016/0092-6566(85)90027-3
14. Rastogi, S. (2023). Emotional Intelligence, Flourishing and Humor Styles: A Correlational Study Among Young Adults » The International Journal of Indian Psychology. *International Journal of Indian Psychology*. https://doi.org/10.25215/1102.150

15. Schweitzer, M. E. (2023). Humor intelligence: Production, perception, prediction, and measurement. *Current Opinion in Psychology*, *55*, 101722. https://doi.org/10.1016/j.copsyc.2023.101722

16. Short, E., Basili, L., & Schatschneider, C. (1993, July 1). *Analysis of humor skills among elementary school students: comparisons of children with and without intellectual handicaps*. PubMed. https://pubmed.ncbi.nlm.nih.gov/7690574/

17. Silvia, P. J., Cotter, K. N., & Christensen, A. P. (2024). Time is a Funny Thing: Response Times and Humor Quality in a Creative Joke Production Task. *Creativity Theories – Research – Applications*, *11*(1), 1–17. https://doi.org/10.2478/ctra-2024-0001

18. Strick, M., Holland, R. W., Van Baaren, R., & Van Knippenberg, A. (2009). Humor in the Eye Tracker: Attention Capture and Distraction from Context Cues. *The Journal of General Psychology*, *137*(1), 37–48. https://doi.org/10.1080/00221300903293055

19. Sun, C., Shen, J., Lin, J., Zhang, T., & Li, J. (2024). The relationship between openness to experience and humor production: Exploring the mediating roles of cognitive flexibility and ambiguity tolerance. *PsyCh Journal*. https://doi.org/10.1002/pchj.799

20. Sun, C., Wang, M., Zhou, X., Liu, G., & Zhou, Z. (2022). Dynamic cognitive processes of humor generation: activation and inhibition of information. *Psychological Research*, *87*(5), 1607–1615. https://doi.org/10.1007/s00426-022-01752-1

21. Uekermann, J., Channon, S., Lehmkämper, C., Abdel-Hamid, M., Vollmoeller, W., & Daum, I. (2007). Executive function, mentalizing and humor in major depression. *Journal of the International Neuropsychological Society*, *14*(1), 55–62. https://doi.org/10.1017/s1355617708080016

22. Wang, M., Zou, H., Zhang, W., & Hou, K. (2018). Emotional Intelligence and Subjective Well-Being in Chinese University Students: The role of Humor Styles. *Journal of Happiness Studies*, *20*(4), 1163–1178. https://doi.org/10.1007/s10902-018-9982-2

23. Zampetakis, L. A. (2010). Unfolding the measurement of the creative personality. *The Journal of Creative Behavior*, *44*(2), 105–123. https://doi.org/10.1002/j.2162-6057.2010.tb01328.x

24. Zheng, W., & Wang, X. (2023). Humor experience facilitates ongoing cognitive tasks: Evidence from pun comprehension. *Frontiers in Psychology*, *14*. https://doi.org/10.3389/fpsyg.2023.1127275

25. Boylan, J. (2018). *Cognitive psychology of humour in puns* (Doctoral dissertation, University of Western Ontario).

26. Attardo, S. (2019). Humor in language. In *Oxford Research Encyclopedia of Linguistics* [Journal-article]. https://doi.org/10.1093/acrefore/9780199384655.013.342

27. Long, D. L., & Graesser, A. C. (1988). Wit and humor in discourse processing. *Discourse Processes*, *11*(1), 35–60. https://doi.org/10.1080/01638538809544690

28. Wu, C., Yen, Y., & Chen, H. (2021). How humor styles affect humor comprehension and appreciation: A typological approach. *Current Psychology*, *42*(19), 16392–16400. https://doi.org/10.1007/s12144-021-01641-7

29. Chang, J., Chen, H., Hsu, C., Chan, Y., & Chang, Y. (2015). Flexible humor styles and the creative mind: Using a typological approach to investigate the relationship between humor styles and creativity. *Psychology of Aesthetics Creativity and the Arts*, *9*(3), 306–312. https://doi.org/10.1037/a0039527

30. Kocak, G. (2018). THE RELATIONSHIP BETWEEN HUMOR STYLES AND CREATIVITY: A RESEARCH ON ACADEMICS. *Eurasian Journal of Business and Management*, *6*(4), 44–58. https://doi.org/10.15604/ejbm.2018.06.04.005

31. Akben, C., & Coskun, H. (2024). Humor supports creativity: evidence that personality traits moderate the effects of humor styles on divergent thinking. *Current Psychology*. https://doi.org/10.1007/s12144-024-06858-w

32. Wu, C., & Chen, H. (2019). The influence of creativity on Incongruity-Resolution and nonsense humor comprehension. *Creativity Research Journal*, *31*(1), 110–118. https://doi.org/10.1080/10400419.2019.1577675

33. Ziv, A. (1988). Using humor to develop creative thinking. *Journal of Children in Contemporary Society*, *20*, 99–116. https://doi.org/10.4324/9781315826127-7

34. Ziv, A. (1976). Facilitating effects of humor on creativity. *Journal of Educational Psychology*, *68*(3), 318–322. https://doi.org/10.1037/0022-0663.68.3.318