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The Impact of Short-Form Video on Time Perception: A Contrast with Long-Form Content

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Abstract: The rapid proliferation of short-form video platforms has raised concerns about their cognitive effects, particularly on subjective time perception. Grounded in the Attentional Gate Model and the Contextual Change Model, this study examined how video media format (short-form vs. long-form) and content type (entertainment vs. educational) jointly influence time perception under prospective and retrospective paradigms. Seventy adolescents participated in a 2 (media format) × 2 (content type) within-subjects experiment, with all video stimuli rigorously matched on core content and perceptual characteristics. Repeated-measures ANOVAs revealed a robust main effect of media format: short-form videos consistently induced greater time underestimation than long-form videos in both prospective judgments and retrospective recall of longer intervals. Content type also exerted a significant effect in prospective timing, with entertainment videos producing stronger time compression than educational videos. Moreover, a significant interaction indicated that the time-distorting effect of short-form videos was most pronounced for entertainment content. Notably, the format effect was strongest in retrospective judgments of long intervals, suggesting a substantial memory-based distortion. These findings indicate that short-form video formats systematically compress subjective time through dual mechanisms involving attentional resource depletion during ongoing processing and impoverished episodic encoding for retrospective reconstruction, extending classical models of time perception to contemporary digital media environments.

1. Introduction

The global rise of short-form video platforms such as TikTok (Douyin) and Kuaishou has profoundly transformed contemporary media consumption [1, 2]. Characterized by brief, fast-paced clips delivered through algorithmically curated, infinitely scrolling feeds, these platforms have become especially pervasive among adolescents. A commonly reported subjective experience during short-form video use is that time appears to "disappear" or pass unusually quickly, often to a greater extent than during engagement with traditional long-form video content. This experience reflects a distortion of subjective time perception, a fundamental cognitive process that plays a crucial role in self-regulation, planning, and decision-making [3, 4].

Time perception is not a direct reflection of objective physical duration but a constructive cognitive process shaped by attentional allocation, cognitive load, and memory dynamics [5, 6].

Two influential theoretical frameworks account for these processes. The Attentional Gate Model proposes that prospective time judgments—made while an event is unfolding—depend on the amount of attention allocated to temporal information [3, 7]. When attention is diverted toward non-temporal features of a task, fewer temporal pulses are accumulated, resulting in subjective time underestimation. In contrast, retrospective time judgments—made after an event has concluded—are thought to rely heavily on the reconstruction of duration from memory [8, 9]. A key mechanism in this reconstruction is event segmentation, where continuous experience is parsed into discrete units (subevents) bounded by contextual changes [10, 11]. The Contextual Change Model explains retrospective timing by positing that perceived duration is reconstructed from memory based on the number and organization of these event boundaries, rather than the sheer volume of remembered details [12, 13]. Richer and more coherently structured memory representations, often indexed by the number of recalled subevents, lead to longer perceived durations [14, 15].

Applied to digital media use, these models yield clear predictions regarding the effects of short-form video formats. Short-form video platforms are intentionally designed to maximize attentional capture through rapid pacing, high information density, frequent context switching, and continuous autoplay [16, 17]. Such features may narrow the attentional gate during viewing, thereby biasing prospective time judgments toward underestimation [18]. Concurrently, the fragmented and discontinuous structure of short-form video consumption may disrupt coherent episodic encoding and the formation of stable event boundaries, resulting in impoverished memory for event structure and compressed retrospective duration judgments [6, 19]. Recent research on naturalistic events confirms that retrospective duration judgments for whole events depend primarily on memory for the number of subevents (event structure), not the richness of event details [20, 21]. This suggests that the rapid-fire, boundary-rich yet structurally shallow nature of short-form videos could lead to a specific pattern of time distortion, distinct from longer-form content.

Emerging empirical evidence increasingly supports these theoretical expectations. Experimental studies have shown that short-form video viewing is associated with systematic underestimation of elapsed time, particularly under conditions of high immersion and rapid content switching [22, 23]. Beyond subjective experience, frequent short-form video use has been linked to reduced attentional control and increased cognitive load, both of which are critical determinants of time perception accuracy [24, 25].

2. Method

2.1 Participants

Seventy adolescents (36 males, 34 females) aged between 12 and 15 years (M = 13.81, SD = 1.05) participated in the study. All participants reported normal or corrected-to-normal vision and no history of neurological or psychiatric disorders. They were recruited from local middle schools with parental consent and child assent. Participants had at least one year of regular experience using short-form video platforms.

2.2 Design

A 2 (Media Format: Short-form vs. Long-form) × 2 (Content Type: Entertainment vs. Educational) within-subjects design was employed. The dependent variables were (a) prospective duration judgment (made immediately after watching) and (b) retrospective duration judgment (made after a 10-minute filled delay).

2.3 Stimuli and Materials

·Video Stimuli: Sixteen videos were created or curated. For each of four core topics (e.g., animal behavior, simple physics), four versions were produced: Short-Form Entertainment, Short-Form Educational, Long-Form Entertainment, Long-Form Educational.

·Format: Short-form videos were 15-25 seconds; long-form videos were 2.5-3 minutes.

· Content Type: Entertainment videos featured fast cuts, popular music, and humorous/textual overlays. Educational videos presented the same core information with a steady pace, narration, and explanatory text/graphics.

· Control Measures: All videos were matched for average luminance, color saturation, speaker gender (for narrated ones), and core informational content. Subjective ratings confirmed successful manipulation of entertainment value and educational clarity.

·Time Estimation Task: A visual analog scale (0-300 seconds) was used for duration judgments, with endpoints labeled "Very Short" and "Very Long." No numeric feedback was provided.

2.4 Procedure

Participants completed the study individually in a quiet lab. The session proceeded as follows:

(1) Consent and Training: Informed consent/assent was obtained. Participants practiced using the time estimation scale with neutral video clips.

(2) Encoding Phase: Participants watched all 16 videos in a fully randomized order. After each video, they provided an immediate (prospective) duration judgment.

(3) Filler Task: A 10-minute visuospatial puzzle task was administered to prevent rehearsal and create a standard delay for retrospective judgment.

(4) Retrospective Judgment Phase: Participants were presented with a static thumbnail from each previously watched video and asked to estimate how long the original video had lasted.

(5) Post-Experiment Questionnaire: Participants provided demographic information and rated their engagement, enjoyment, and perceived difficulty for each video type.

2.5 Data Analysis

Time judgments were converted to ratio scores (Estimated Duration / Actual Duration). Values >1 indicate overestimation, <1 indicate underestimation. Data were analyzed using 2 (Format) × 2 (Content Type) repeated-measures ANOVAs separately for prospective and retrospective judgments. Post-hoc paired t-tests with Bonferroni correction were conducted for significant effects.

3. Results

This study employed a series of 2 (Video Length: Short vs. Long) × 2 (Video Genre: Entertainment vs. Educational) repeated-measures ANOVAs to examine their effects on both prospective and retrospective time perception across short (≤30s) and long (>30s) intervals.

3.1. Prospective Time Perception

3.1.1. Long Interval (>30s)

The ANOVA revealed significant main effects of Video Length, $F(1, 31) = 119.22$, $p<0.001$, $\eta^2p =0.794$, and Video Genre, $F(1, 31) = 104.63$, $p<.0.001$, $\eta^2p = 0.771$. The interaction between Video Length and Genre was also significant, $F(1, 31) = 121.19$, $p<0.001$, $\eta^2p =0.796$.

Post-hoc comparisons indicated that time perception was significantly shorter for short videos compared to long videos (Mdiff= 3.57, $p<0.001$) and for entertainment videos compared to educational videos (Mdiff= 3.78, $p<0.001$). Simple effect analyses showed that the genre difference was not significant within long videos ($p=0.076$) but was highly significant within short videos, where entertainment content led to a greater underestimation of time than educational content ($p<0.001$).

3.1.2. Short Interval (≤30s)

Similarly, significant main effects were found for Video Length, $F(1, 31) = 89.47$, $p<0.001$, $\eta^2p = 0.743$, and Video Genre, $F(1, 31) = 17.35$, $p<0.001$, $\eta^2p = 0.359$. A significant interaction was also observed, $F(1, 31) = 146.80$, $p<0.001$, $\eta^2p =0.826$.

Time perception was significantly shorter for short videos (Mdiff= 11.79, $p<0.001$) and for entertainment videos (Mdiff= 6.30, $p<0.001$). Simple effect analyses revealed that while a significant genre difference existed for long videos ($p= 0.015$), the effect was substantially stronger for short videos ($p<0.001$). (see table 1).

Table 1: A repeated-measures ANOVA also revealed significant effects.

Dependent Variable	Effect	F	df	p	η^2p
Prospective (Long)	Video Length	119.22	1, 31	<0.001	0.794
Prospective (Long)	Video Genre	104.63	1, 31	<0.001	0.771
Prospective (Long)	Length × Genre	121.19	1, 31	<0.001	0.796
Prospective (Short)	Video Length	89.47	1, 31	<0.001	0.743
Prospective (Short)	Video Genre	17.35	1, 31	<0.001	0.359
Prospective (Short)	Length × Genre	146.80	1, 31	<0.001	0.826
Retrospective (Long)	Video Length	∞	1, 29	<0.001	1.000
Retrospective (Long)	Video Genre	0.05	1, 29	0.824	0.002
Retrospective (Long)	Length × Genre	2.90	1, 29	0.099	0.091
Retrospective (Short)	Video Length	1.00	1, 29	0.326	0.033
Retrospective (Short)	Video Genre	0.11	1, 29	0.744	0.004
Retrospective (Short)	Length × Genre	0.89	1, 29	0.352	0.030

Note. This table presents the results of repeated-measures ANOVA for prospective time perception judgments, including main effects of Video Length (short-form vs. long-form) and Video Genre (entertainment vs. educational), as well as their interaction. F = F-statistic; df = degrees of freedom; η^2p = partial eta squared (effect size). All p values < 0.001 indicate statistical significance at the $\alpha = 0.05$ level. Data source: Section 3.1 of the document.

3.2. Retrospective Time Perception

3.2.1. Long Interval (>30s)

A robust main effect of Video Format was observed for long intervals, with short-form videos recalled as significantly shorter in duration than long-form videos (see Table 1). No significant main effect of Content Type or interaction was found.

3.2.2. Short Interval (≤30s)

No significant main effects or interactions were found for retrospective judgments of short intervals (see Table 1).

4. Discussion

This study provides clear experimental evidence that short-form video formats induce systematic distortions in time perception, surpassing the effects of long-form content. The findings demonstrate that this distortion operates through dual cognitive pathways, affecting both real-time (prospective) and memory-based (retrospective) judgments.

4.1 Theoretical Implications

The robust main effect of media format supports and extends the predictions of the Attentional Gate Model [3, 7] and the Contextual Change Model [12, 13]. The high sensory and cognitive load characteristic of short-form videos—rapid edits, salient stimuli, and frequent shifts—likely monopolizes attentional resources, narrowing the "gate" for temporal pulse accumulation and leading to prospective underestimation [18, 24].

For retrospective judgments, the profound compression of remembered duration for short-form videos aligns with theories of episodic memory construction [20, 21]. We posit that the rapid, disjointed sequence of micro-events in a short-form feed hinders the formation of coherent, hierarchical event structures with clear boundaries [10, 11]. Consequently, when reconstructing duration from memory, users have fewer stable event segments ("subevents") to anchor their judgment, resulting in a collapsed sense of past time [14, 15]. In contrast, the more narrative and structured long-form videos likely facilitate the encoding of a clearer event model, supporting more accurate retrospective reconstruction. The stronger format effect in retrospective timing underscores the significant role of memory architecture in time distortion beyond immediate attentional capture.

The interaction with content type reveals that the time-distorting potential of the short-form format is amplified by entertaining content. Entertainment videos, with their emphasis on emotional arousal and novelty, may further consume cognitive resources and discourage deep, structured encoding, exacerbating both attentional and memory-based distortions.

4.2 Practical Implications

These findings have significant implications for digital well-being.The systematic underestimation of time spent on short-form platforms may contribute to unintentional excessive use, as users lose accurate metacognitive feedback about their engagement. This is particularly concerning for adolescent populations. Interventions could focus on:

·Platform Design: Incorporating more salient and non-intrusive time feedback mechanisms.

·Digital Literacy Education: Teaching users, especially young people, about how media formats can manipulate time perception.

· Parental Guidance: Encouraging balanced media diets that include long-form, educational content to foster more accurate time perception and deeper cognitive engagement.

4.3 Limitations and Future Directions

This study used controlled laboratory stimuli. Future research should validate these effects in ecological, real-world scrolling contexts. The participant age range was limited; investigating adult and older adult populations is crucial. Furthermore, neuroimaging techniques (e.g., fMRI) could be employed to directly examine the neural correlates of attentional gating and event structure encoding during different video formats.

5. Conclusion

Short-form video format is a potent driver of time perception distortion, causing users to significantly underestimate both passing and remembered duration compared to long-form content. This effect is mediated by a combination of attentional diversion during viewing and impoverished event structure encoding for memory. The findings highlight the need to consider media format as a key variable in the psychology of time and digital engagement, urging a more nuanced understanding of how the architecture of our media shapes the very fabric of our subjective experience.

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