The Impact of Sponsorships on Authenticity and Engagement on Fitness TikTok

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BUS 439 Analytics Project
FALL 2025
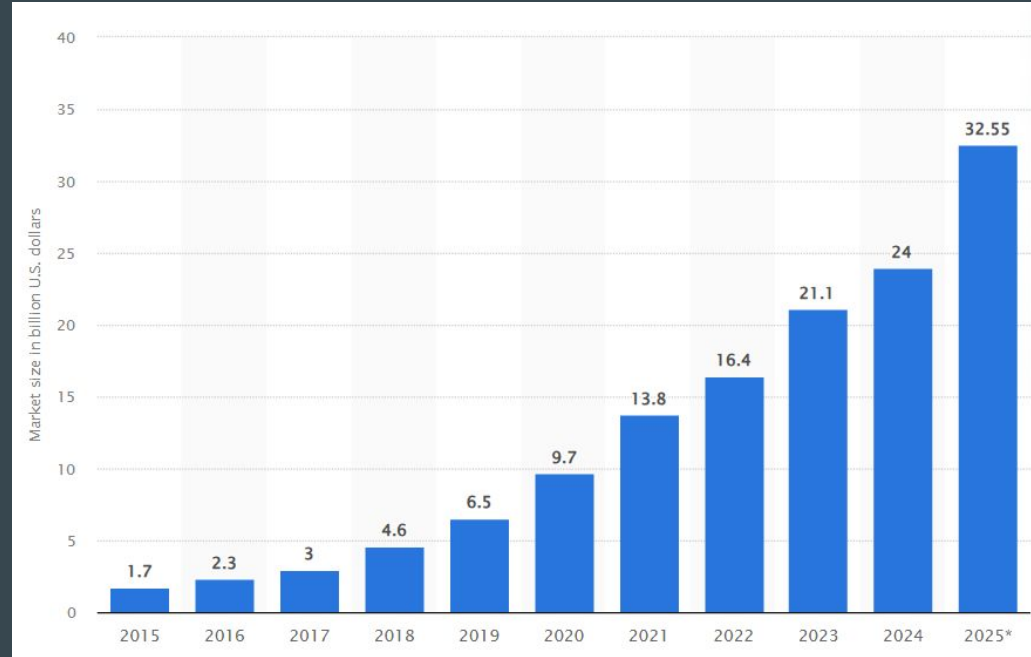Vibhuti Gandhi

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Background

Influencer Marketing

With over **80%** of marketers viewing influencer marketing as highly effective, TikTok has rapidly emerged as a leading platform, now preferred by **52%** of brands.

(Influencer Marketing Hub, 2025; ScienceDirect, 2025)

Influencer marketing market size worldwide from 2015 to 2025

Theoretical Framework

Persuasion Knowledge Model (PKM): sponsorship disclosures "activate" a consumer's persuasion knowledge, leading them to critically evaluate content and resist the message. (Friestad & Wright, 1994)

Attribution Theory & Creator Tier:

- Micro-Influencers: Perceived as "Intrinsic" (Passion-driven) → High Trust.
- Macro-Influencers: Perceived as "Extrinsic" (Money-driven) → Low Authenticity. (Walsh et al., 2024)
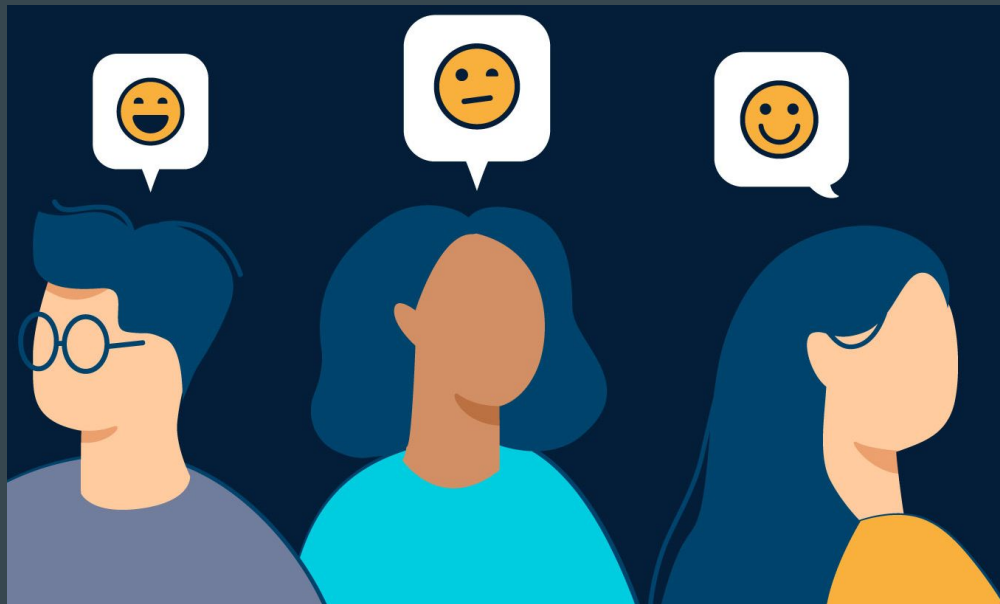
Research Motivation

Problem

Research indicates that influencer authenticity is key to driving brand loyalty (Baghel, 2024), yet marketers are flooding platforms like TikTok with sponsored content.

Gap

Empirical work remains sparse on directly quantifying the difference in linguistic authenticity and engagement rates between sponsored and organic content on fitness TikTok.

Goal

The following project aims to establish a quantifiable link between sponsorship status and the "sell-out" effect, providing data-driven recommendations for brands and creators.

Methodology

Methodology

Data Collection	Sponsorship Classification	Feature Engineering	Research Design	Statistical Modelling

Data Collection

- Sample **100 videos per 25 fitness creators on TikTok**, stratified by followers:
High (>1 million): **8 creators**
Medium (100k to 1 million): **9 creators**
Low(<100k): **8 creators**

- Use the yt-dlp scraper tool to build a dataset of 2,500 videos. Extract metadata of each video: (Views, Likes, Comments, Shares, etc.) along with video description & transcripts wherever available.

Sponsorship Classification

- Build a **multi-signal sponsored content heuristic classifier**

- 8 detection methods: Explicit, Implicit, Promo Codes, Brand mentions, CTA Phrases, Transcript Analysis, Engagement Anomaly, Product Recommendation

- Weighted scoring of each method then pooling the results together

Feature Engineering

- Constructed a composite **"Engagement Rate"** using Log-transformation to stabilize variance (Likes + Comments + Reposts / Views).

- Constructed a "**Authenticity Score**" using by decomposing TikTok Descriptions into five independent dimensions using dictionary based approaches (EMPATH & VADER): Commercialism Warmth, Immediacy, Self-Focus , Readability.

Research Design

- Method: **Temporal Within-Creator Matching**.

- Logic: For every sponsored video (n=175), the algorithm identified the 3 closest organic videos from the same creator based on upload date.

- Purpose: This controls for creator evolution and seasonality, effectively making each creator their own control group.

- Final Sample: A matched dataset of **700 observations** across **22 creators**.

Statistical Modelling

- **Model A** (Engagement Drivers):
Type: **Mixed Linear Models (REML)**.
Specification: Random intercepts by creator to account for unobserved heterogeneity.
Controls: Word count and Topic ID.

- **Model B** (Authenticity Effects):
Type: **OLS Regression** with Heteroscedasticity-Robust Standard Errors (HC3).
Scope: Analyzed only the sponsored subset (n=175) to determine which features drive performance.

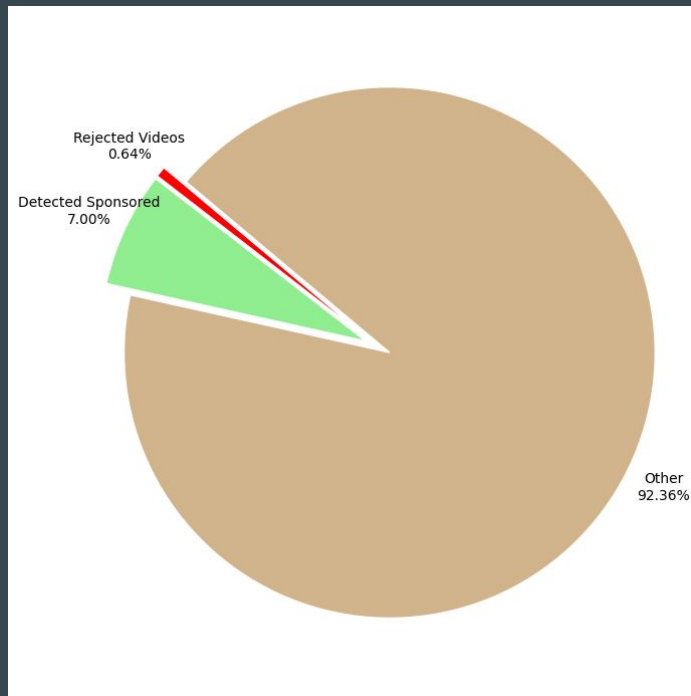# Analysis

Data At a Glance

25

Fitness Creators

2500

TikTok Videos

175

Sponsored Videos

16

Rejected Videos

Sponsored Videos make up 7% of the total videos of the sample.

Sponsored Content Detection

In both the US and Canada, failure to use a clear disclosure (like TikTok's "Paid Partnership" tool or a visible #ad hashtag) is not only a breach of platform policy but is considered **illegal deceptive marketing** under federal law.
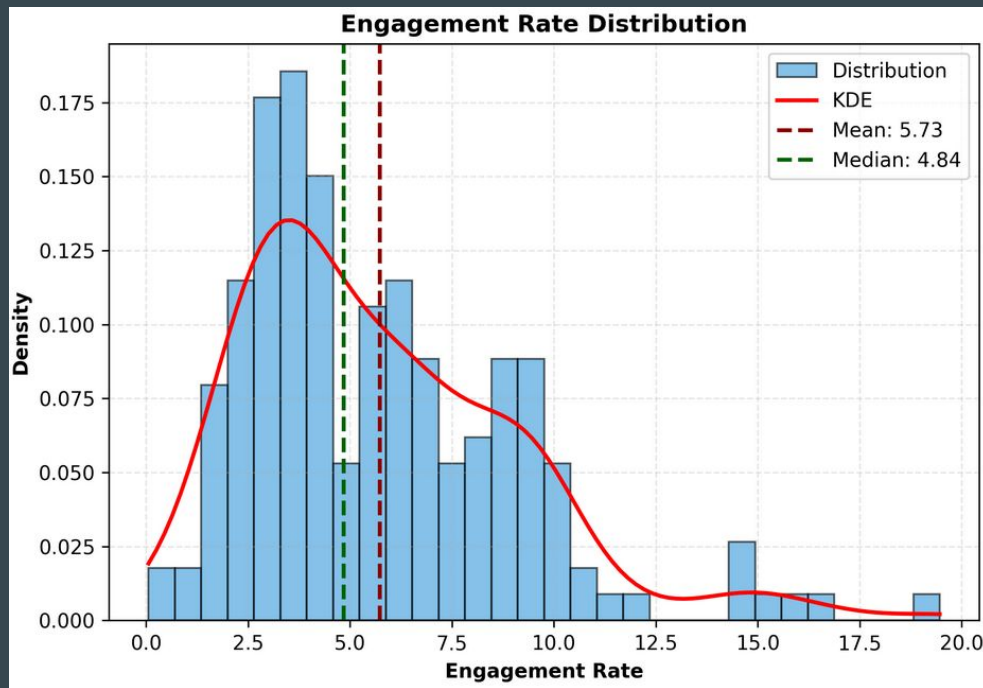
(Federal Trade Commission, 2020; Competition Bureau of Canada, 2022)
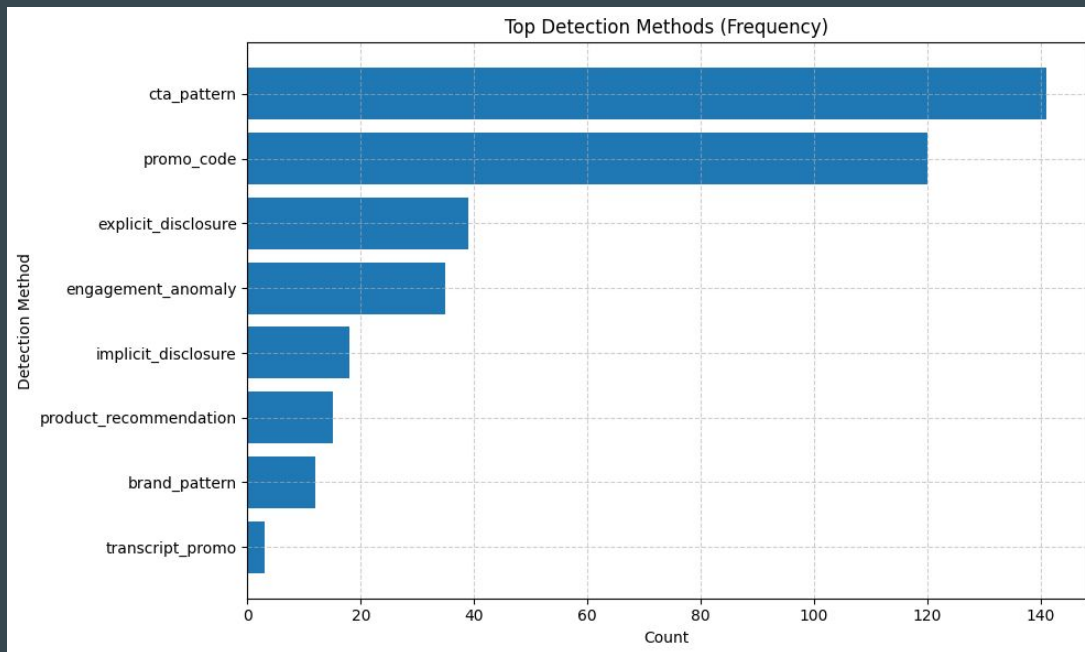
Manual audit of 50 random positive samples showed 93% precision

Engagement as a Measure of Success

- Accurately Measures How Well the Content Resonates

- Normalizes Performance Across Different Creators and View Counts

- Provides the Best Available Proxy Since Sales/Click Data Is Missing

Engagement Rate = (Likes + Comments + Reposts) / Views

Engagement of Sponsored Videos

High-follower creators achieve the highest mean engagement rate **(6.80%)** on sponsored content, followed by low-follower creators **(5.58%)**.
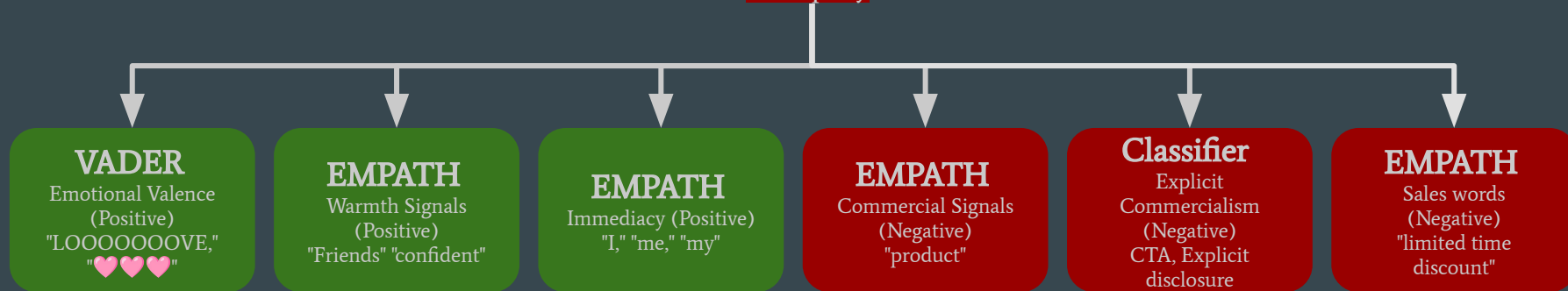
Medium-tier creators show the lowest engagement **(5.36%)** as they often suffer from "growing pains"; they have lost the intimacy of small creators but haven't gained the star power of large ones

Video Count and Mean Engagement Rate by Follower Tier
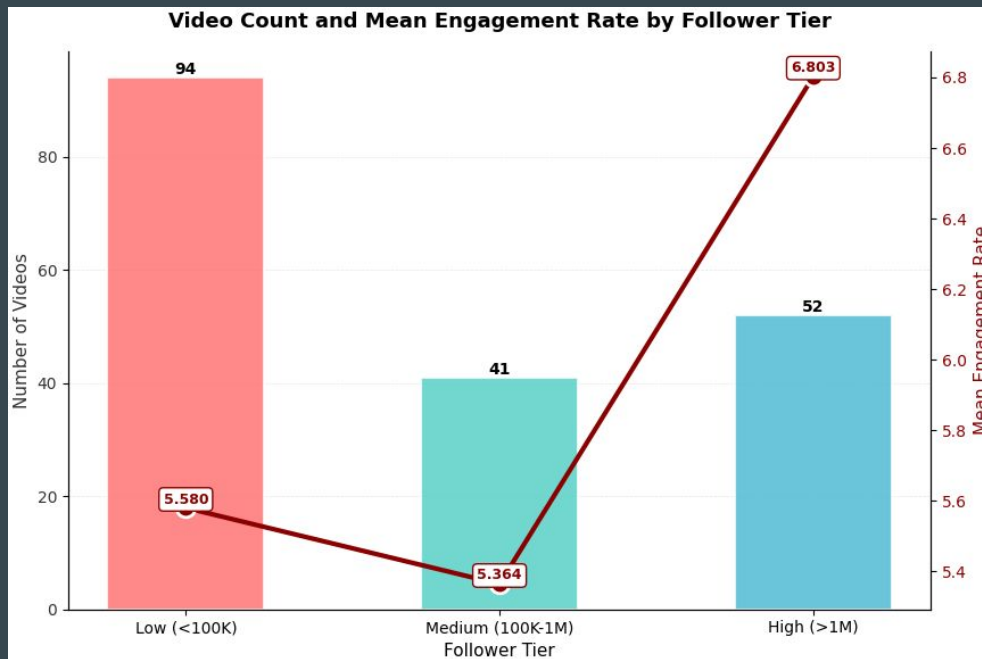
Capturing Authenticity

Video Description:

"I absolutely LOOOOOOOVE this product 💗💗💗!!! It makes me feel so confident. All my friends use it! Check the link in bio for a limited time discount. #self-love #ad #company"

VADER
Emotional Valence (Positive)
"LOOOOOOOVE," "💗💗💗"

EMPATH
Warmth Signals (Positive)
"Friends" "confident"

EMPATH
Immediacy (Positive)
"I," "me," "my"

EMPATH
Commercial Signals (Negative)
"product"

Classifier
Explicit Commercialism (Negative)
CTA, Explicit disclosure

EMPATH
Sales words (Negative)
"limited time discount"

VADER
"The Tone"

We chose this over standard sentiment tools because VADER is tuned for social media. It understands that CAPS LOCK indicates intensity and that emojis carry weight. This gives us our 'Emotional Valence' score.

EMPATH
"The Topic"

Unlike VADER, which measures tone, Empath measures topics. We programmed it to scan for two opposing clusters: Warmth Categories: Words related to family, trust, and friends. Commercial Categories: Words related to money, business, and transactions. This allows us to detect when a creator shifts from storytelling to selling.

Quantifying Authenticity

Authenticity Score = $\dfrac{\Sigma(\text{Warmth, First-Person Usage, Readability}) - \Sigma(\text{Commercial Intent})}{5}$

All features are z-scored to create a balanced 0-100 index.

Warmth
Family, Friends, Trust

Immediacy
First-person pronouns "I/Me/My"

Sentiment
Positive Sentiment

Readability
Positive Sentiment & High Readability

Commercialism
Money, Business, "Link in Bio", #Ad

Combine VADER's emotional score with EMPATH's thematic categorization, we created a composite index that rewards emotional warmth and penalizes transactional language.

This score was further validated by using human annotating.

Insights

The "Sell-Out" Effect

There is a **statistically significant drop** in authenticity when a video is sponsored!

Validates the **Persuasion Knowledge Model**: when consumers see a sponsorship disclosure, they "activate their persuasion knowledge," becoming skeptical and critical of the content. (Friestad & Wright, 1994)

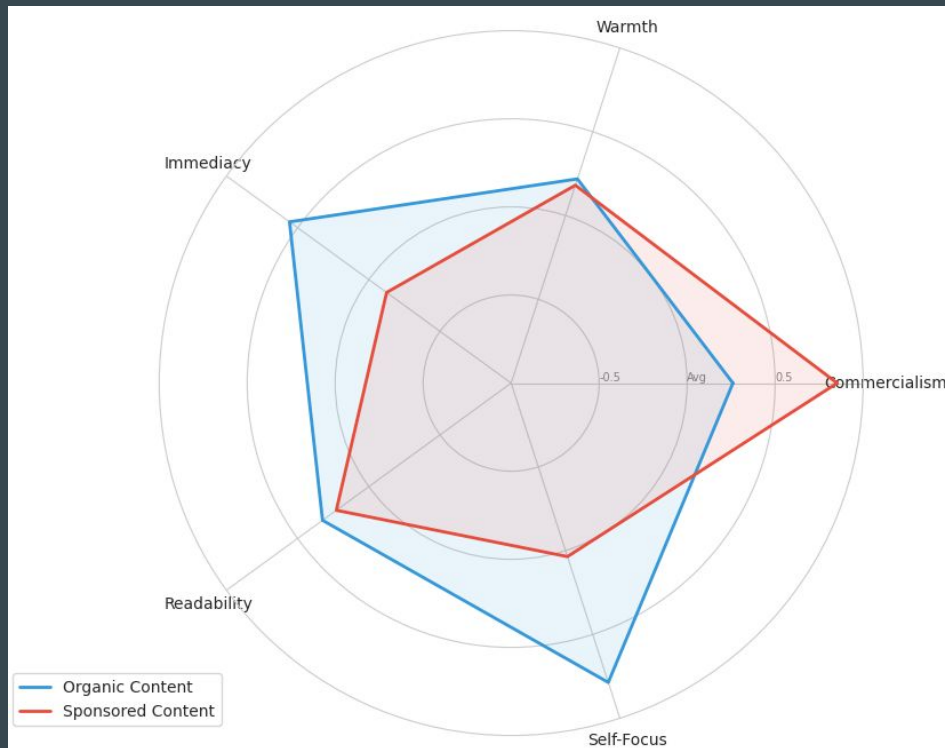Figure 1: The Effect of Sponsorship on Linguistic Authenticity
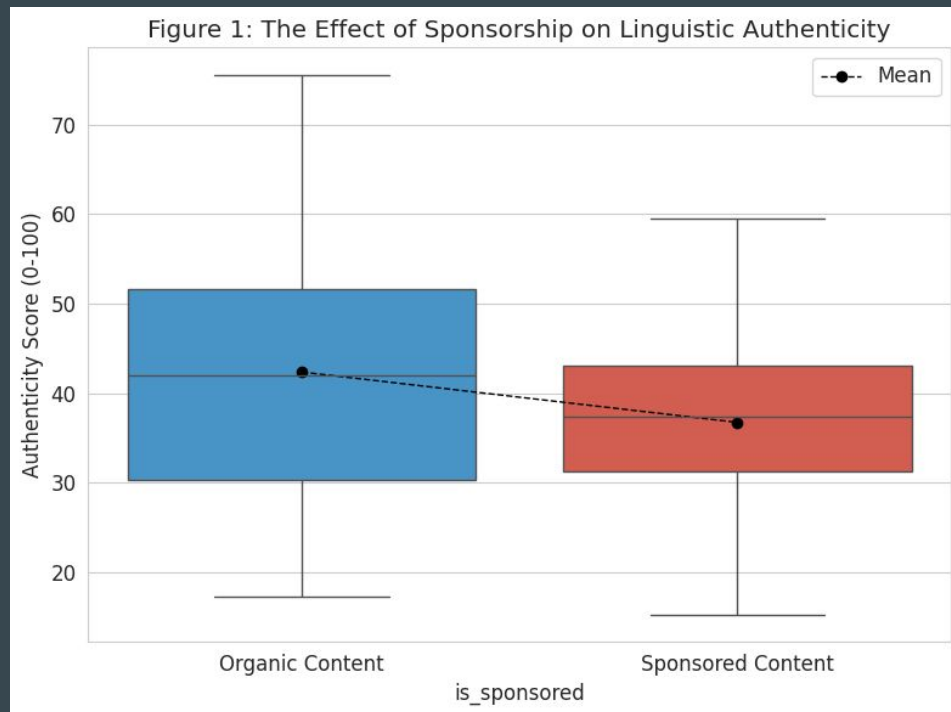
The Change in Authenticity

Self-focus and immediacy takes a big hit in sponsored content vs. organic content, dropping by **~60%** in sponsored posts.

Warmth and Readability stays relatively the same.

Naturally, Commercialism sees a big increase!

Moderation Analysis

**The bigger the influencer, the less authentic they sound in ads!**

Creators with 1M+ followers drop **~13 points** in authenticity vs. just **~5 points** for smaller creators

As follower counts rise, consumers shift their attribution from 'sharing information' to 'seeking monetary gain'. Medium-Tier creators are in the worst position: they trigger this skepticism but lack the star power to overcome it (Walsh et al., 2024)

Figure 3: Empirical Moderation Effect by Creator Tier
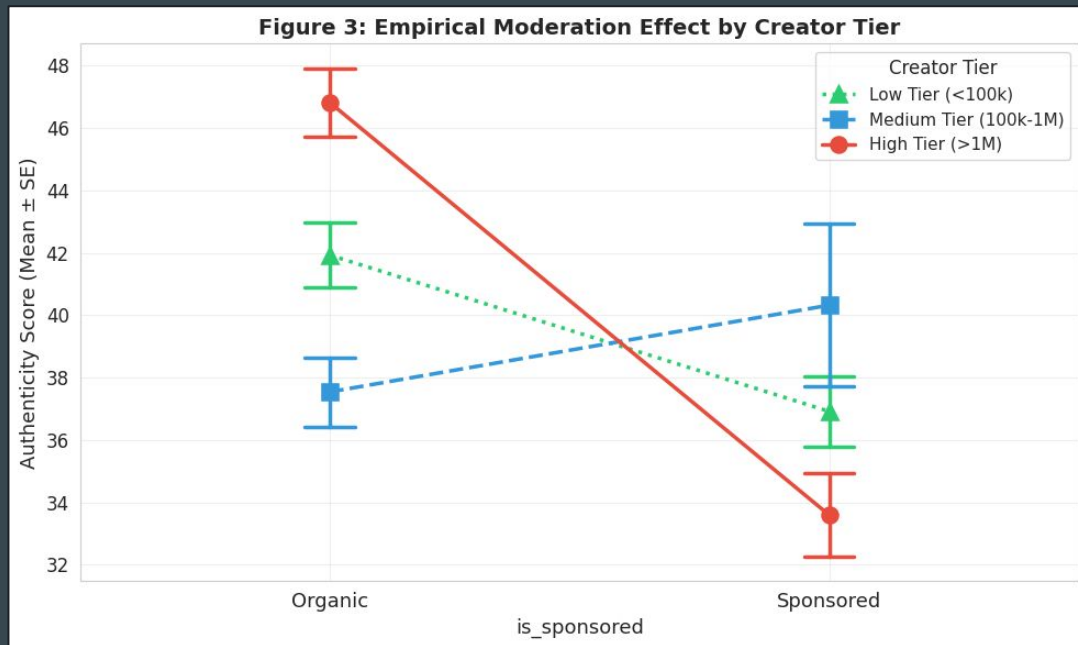
Does Authenticity Pay?

While prior research (Walsh et al., 2024) used surveys to measure feelings of inauthenticity, Our regression model confirms that **maintaining "human" language (high authenticity score) is a significant predictor of performance** , validating survey-based theories with empirical data.

Figure 4: Authenticity vs. Engagement (Sponsored Videos Only)
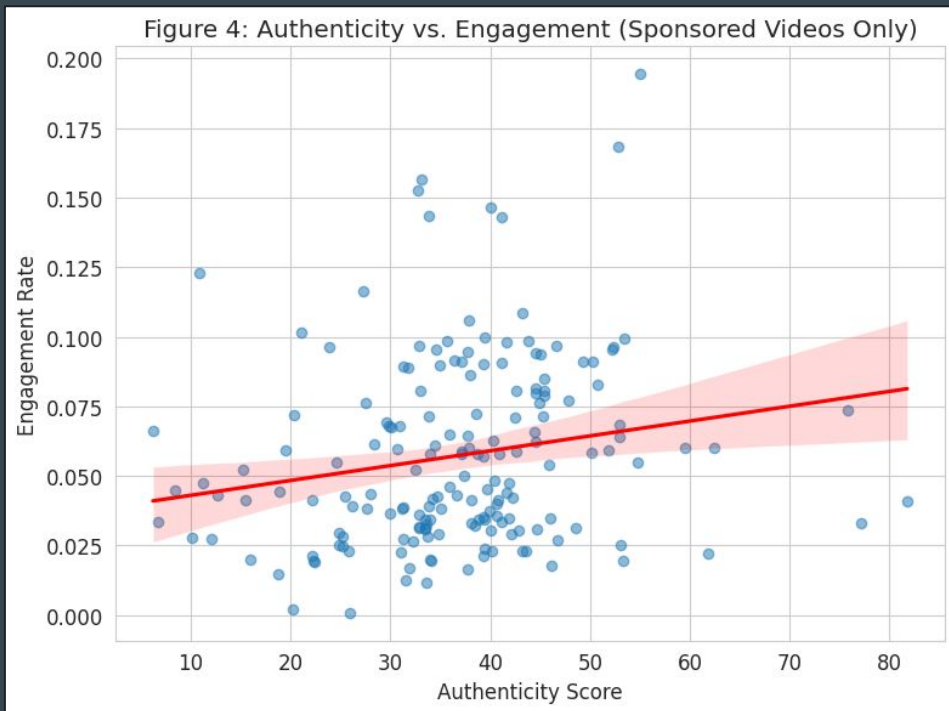
Recommendations

Recommendations For Micro-Influencers (<100k)

Strategy : Laissez-Faire (Hands-Off)

Why: Our study shows that small creators naturally maintain their 'voice' even when sponsored. Their audience trusts them implicitly.

Action :

- **Do not provide a script** . Give them a product and a key message, then step back.
- **Leverage for Conversion** : Use these creators for detailed product demos or testimonials, as their "Immediacy" (use of 'I', 'Me') remains high.

Recommendations For Medium-Tier Influencers (100k - 1M)

Strategy : The Authenticity Audit

Why: This group is in a 'middle-child' slump. They showed the lowest engagement rate. They have lost the raw intimacy of small creators but haven't gained the superstar status of large ones.

Action :
- **Intervene on Scripts** : Brands need to actively help these creators inject "Warmth" back into their captions.
- **Focus on Warmth Keywords** : Mandate the inclusion of words related to friends, family, or trust to boost their lower engagement scores.

Recommendations For Macro-Influencers (>1M)

Strategy : Explore new partnerships

Why : These creators sell out the hardest, with the steepest fall in engagement when comparing their sponsored and organic videos.

Action :

- Mitigation of the 'sell-out' effect can come by **partnering with smaller, lesser-known brands** as audience perceives this as a genuine endorsement rather than a cash grab. (Walsh et al., 2024)

Limitations & Future Work

Limitations

Engagement ≠ Sales

The analysis uses Engagement Rate (Likes + Comments + Reposts) as a proxy for success because actual conversion/sales data is private. A video can be "engaging" (viral) but fail to sell the product.

Authenticity Score

The "Authenticity Score" relies on VADER and EMPATH, which analyze text. This misses visual cues (facial expressions, body language) and audio tone (sarcasm vs. sincerity) which are critical on TikTok.

Sample Size

The study analyzed 25 creators and 2,500 videos. While statistically sufficient for a t-test, this sample may not fully represent the entire fitness niche or be applicable to other genres (e.g., Tech, Beauty).

Future Work

Multimodal Analysis

Incorporate Computer Vision to analyze the video frames (e.g., detecting if the product is visible on screen) and Audio analysis to detect vocal stress or excitement.

LLM-Based Scoring

Replace VADER/EMPATH with a Large Language Model (e.g., GPT-4 or Llama) to detect "Authenticity." LLMs understand nuance and context better than rule-based dictionaries like VADER.

Thank You!

Let's discuss any doubts or concerns.

If something comes up later, please reach out via vga17@sfu.ca

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