

Exploring Black Friday Using Sentiment Analysis and Topic Modeling

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Introduction Black Friday (BF) in the U.S. is the Friday after Thanksgiving and is considered the beginning of the holiday shopping season (Midrack, 2022). Black Friday is not only the most popular day for in-store shopping in the U.S., but also the most popular day for online shopping since 2019. A recent survey found that 43% of respondents miss the chaos of in-store shopping on BF (Melore, 2022). BF shopping has also attracted much attention in academia. Three main research topics included BF rituals; shopper motivations and attitudes, and consumer misbehavior (e.g., Lennon et al., 2011; Lennon et al., 2017; 2018). Recently, however, consumers' BF behavior patterns and perceptions may have changed (Peters & Thomas, 2022). In addition, online spending on Black Friday has significantly increased whereas in-store foot traffic declined with a 37% decrease on BF 2020 (Inman, 2020). While early literature has primarily focused on in-store BF shopping experience (e.g., Thomas & Peters, 2011), little is known about the shifting BF shopping trends and evolving consumer experiences on BF.

Theoretical Framework To fill the gap, we conducted exploratory research grounded in the cognition-affect-conation model (CAC, Lavidge & Steiner, 1961). The CAC model can be used to understand consumer behavior. The model consists of cognitive (thinking), affective (feeling/emotion), and conative (doing) stages. According to the model affect/emotion is part of consumer behavior (e.g., I like BF sales; I hate the BF crowds). We aim to provide a holistic picture of consumers' views on BF consumption through mining BF-related tweets posted from November 2006 – November 2020. Research questions were: (1) how do consumers feel about BF shopping? (2) what are the main themes related to BF shopping? and (3) how do the themes change over time? Sentiment analysis and topic modeling are used to address the research questions. Sentiment analysis is used to identify “an index of positive and negative emotions” of the text (Tokarchuk et al., 2022). Topic modeling is “used to analyze the text documents by extracting the underlying topics (latent themes) from the documents” (Sharma et al., 2021, p. 3).

Methods and Results This study included four phases. In phase 1, 138,424 tweets posted during Thanksgiving week from 2006 to 2020 were extracted using SNSCARPE using keywords such as Black Friday, misbehavior, ritual, and sale. Then, in phase 2 hashtags, symbols, @mentions, hyperlinks and derogatory terms were removed to improve retrieval of information from the text which helps in decision-making. In phase 3, sentiment analysis was performed. We determined the polarity of the content and classified the content into positive, neutral, and negative using natural language processing and machine learning. Finally, latent dirichlet allocation (LDA) was performed for topic modeling. The topic modeling process involved tokenizing the sentences, lemmatizing the words, and building the topics. Polarity analysis results indicated that the overall tweet tone stayed neutral, with a slight drop in 2017. Over the years, tweets related to BF

shopping were shown to be more negative than positive. Topics of positive sentiments contain sales and online shopping, while topics of negative sentiments include stockouts and violence/death. Four major themes identified include festive experience, BF shopping and deals, BF misbehavior, and stock out (Figure 2). Through further topic modeling analysis, 16 topics were identified: *holiday, hotel and flight deals, Thanksgiving rituals, season(al) shopping, shopping deals, promotion and sales, online discounts and shopping, electronic products, chaos at store, fight for deals, bad traffic and congestion, bombs and death, long waits, violence due to stock out, out of stock, unavailability of products*. Figure 3 showed that festive experience is still important for BF shopping, which experienced a steep drop between 2014 and 2019 and started increasing since then. Conversely, deals have become less important for consumers as BF shopping and deals experienced a decline since 2018. BF misbehaviors have decreased since 2016. Interestingly, the topics related to stockouts significantly dropped in 2018 and bounced back in the next year.

Discussion and Conclusion This study used a computational content analysis to discover and compare topics based on natural social conversations about BF as they occurred on the social media platform. Findings through sentiment analysis and topic modeling provide evidence of changes in consumer beliefs and perceptions of BF shopping. The findings of this study complement existing BF research primarily based on cross-sectional surveys of BF shoppers. For example, the current study revealed that consumers' desires for festive experiences during BF shopping increased in recent years while more tweets have a negative tone focusing on consumer misbehavior and stockouts. This is consistent with previous BF studies (e.g., Lennon et al., 2017) that found both positive and negative emotions contributed to consumer misbehavior on BF. Further research could be done to understand the historical insights that contribute to the observed changes. Moreover, this study offers managerial implications such as the importance of a festive shopping environment and responsive inventory management in BF shopping.

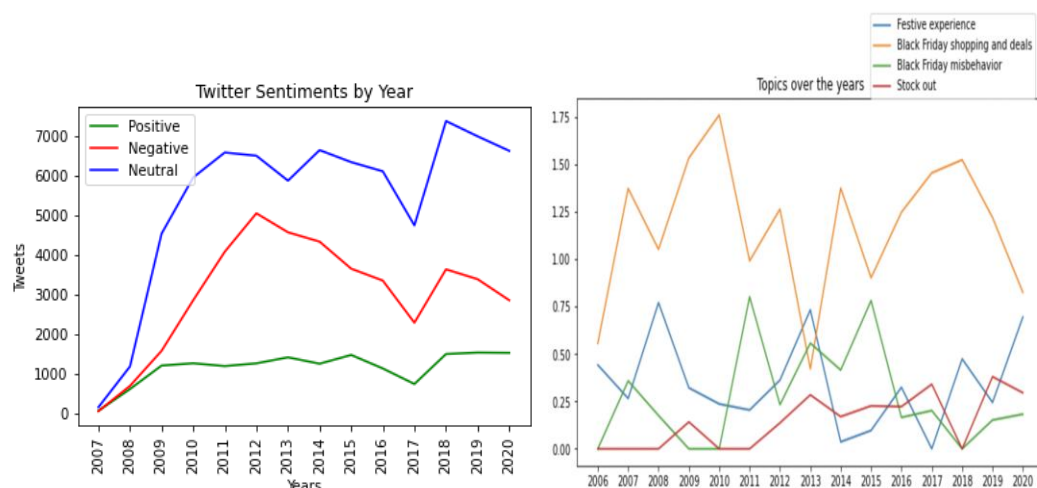


Figure 1. Sentiment analysis results

Figure 2. Identified topics and trends

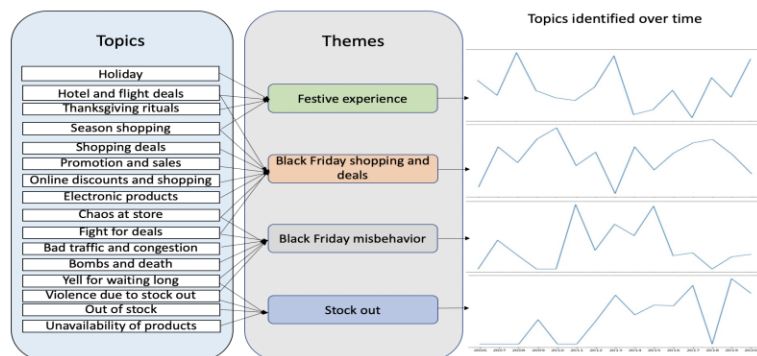


Figure 3. Summary of identified topics, themes, and trends related to BF shopping

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