

What's the Beef with Consumer Appeal?

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Abstract

The objective of this study was to determine the specific color consumers most prefer as the appealing bright, cherry-red beef color. Color samples were created from an original hexadecimal color code value that was assumed to be the most ideal bright, cherry-red beef color to encompass variations of beef color consumers may experience in a retail setting. A 5 × 5 color grid was designed from the original hex that examined darker tones of red to the left, brighter shades vertically, lighter hues to the right, and duller tones downward from the central hex. Each distinguishing trait of darkness, brightness, lightness, and dullness contained two samples of each color deriving from the original hex to produce nine base color squares. From the nine basic colors, four additional hexes were developed stemming from two traits within each quadrant. Consumers were given a survey with 10 randomly selected color samples and evaluated for their overall liking of the color, and they were asked if they would purchase beef steaks in retail if it were the given color. For consumer liking results, samples were compared horizontally (A, B, C, D, and E) based on darkness to lightness and vertically based on brightness to dullness. For row A, A2 resulted in a higher ($P < 0.05$) overall liking score compared to A1 (darkest) and A5 (lightest), being similar ($P > 0.05$) to A3 and A4. As the hexes became duller than row C, the consumers shifted their overall liking scores to favor the lighter hexes. Overall, the results indicate consumers favor moderately light and bright hexes over dark hexes, regardless of brightness, with extremes in lightness and especially darkness being undesirable to consumers.

Introduction

Meat color is a major factor influencing consumer purchasing decisions for beef in the retail case (Harr et al., 2022). Consumers typically associate a bright, cherry-red color with fresh, high-quality products, which influences the decision to purchase (Killinger et al., 2004). Retailers and meat processors strive to maintain this optimal color to maximize sales and meet consumer expectations. Although this preferred beef color is recognized, minimal research has been conducted to precisely define the specific hexadecimal code value that consumers prefer. Establishing a standardized color reference could provide valuable insights for the meat industry, bridging the gap between consumer perception and color identity.

Experimental Procedures

Color samples ($n = 25$) were developed to represent variations of beef originating from a hexadecimal code (hex) that was presumed to be the ideal bright, cherry-red beef color. To explore the influence of color attributes on consumer perceptions, the original

hex was systematically modified by adjusting the brightness and contrast levels, resulting in a 5×5 color grid. The color sample development encompassed horizontal (A, B, C, D, and E) and vertical (1, 2, 3, 4, and 5) adjustments. From the central hex, two successive samples were generated to the left, each incrementally darker, simulating darker-red tones. Conversely, the two samples to the right were progressively lighter, depicting paler-red hues. Similarly, moving upward from the central hex, two samples were incrementally brightened to enhance vibrancy, while two samples downward from the central hex were dulled to represent muted red tones. With nine colors creating a base, four additional hexes were developed based on the interaction of two traits. For dark, bright red, samples A1, A2, B1, and B2 were designed. Light, bright reds were formed in samples A4, A5, B4, and B5. Dark, dull reds were created as D1, D2, E1, and E2. Lastly, light, dull reds were represented from samples D4, D5, E4, and E5. A comprehensive survey using a square sample of each color against a black background was formed using the Qualtrics platform. Consumers ($n = 192$) were presented with a random selection of ten color samples out of the 25 developed. For each sample, consumers were asked to evaluate the color as if they were purchasing beef at retail by determining their overall liking and purchasing intent. The overall liking was determined using a 100-point line scale where 0 indicated extremely dislike, and 100 signified extremely like. Also, consumers were asked if they would purchase a beef steak (yes/no) with the selected color to determine purchasing intent. To ensure consistency, the survey was conducted on electronic tablets with a constant screen brightness. Data were analyzed using SAS PROC GLIMMIX as a completely randomized design using the SLICE function to restrict comparisons within rows and columns. Alpha was set at 0.05.

Results and Discussion

For the consumer liking results (Figure 1), samples were compared horizontally based on darkness to lightness and vertically based on brightness to dullness. For horizontal comparisons, each row (A, B, C, D, and E) contained samples numbered 1 - 5, with each compared to the others. For row A, A2 resulted in a higher ($P < 0.05$) overall liking score compared to A1 (darkest) and A5 (lightest) and was similar ($P > 0.05$) to A3 and A4. In row B, B2, B3, B4, and B5 were all scored similar ($P > 0.05$) and higher ($P < 0.05$) than B1, which was the darkest. Similarly, for row C, C3 was rated higher ($P < 0.05$) than C1 (darkest), and C5 (lightest), while being similar ($P > 0.05$) to C2 and C4. As the hexes became duller than C, the consumers shifted their overall liking scores to favor the lighter hexes. In row D, the consumers rated D3 and D4 higher ($P < 0.05$) than D1 and D2, which were the two darkest hexes. Following the same trend, for row E, E3, E4, and E5 were all rated higher ($P < 0.05$) than the darkest hexes of E1 and E2.

Additionally, the color samples were analyzed vertically, comparing brightness to dullness, within columns 1, 2, 3, 4, and 5 (Figure 1). In column 1, the darkest column, consumers preferred A1, the brightest hex, ($P < 0.05$) and decreased in liking descending to E1 (dullest). Similarly, column 2 displayed the same behavior, with consumers favoring ($P < 0.05$) the brightest hex and decreasing liking down the column. For column 3, A3, B3, C3, and D3 were all rated higher ($P < 0.05$) than E3 (dullest). In the lighter-colored column 4, consumers preferred brighter hexes over the duller hexes. The brighter shades of A4, B4, and C4 were similar ($P > 0.05$) and all preferred ($P < 0.05$) over the duller hexes of D4 and E4. In column 5, B5 was rated higher ($P < 0.05$) than A5 (brightest), D5, and E5 (dullest), with C5 being similar

($P > 0.05$). The consumer purchasing intent results demonstrated similar findings as the consumer liking results.

For both consumer liking and purchasing intent scores (Figure 2), consumers favored the moderately light and bright hexes over the dark hexes regardless of brightness. However, as the hexes became duller, the consumers became even more critical of the darker hexes. The assumed descriptor of bright, cherry-red beef preferred by consumers was identified as brighter-colored (Hex number: #C10100) beef that was moderate in darkness, with the extremes in lightness and especially darkness not being desirable to consumers.

Implications

Consumers prefer moderately light and bright shades of beef color over darker hues. As beef color becomes darker, consumers become more critical regardless of brightness.

References

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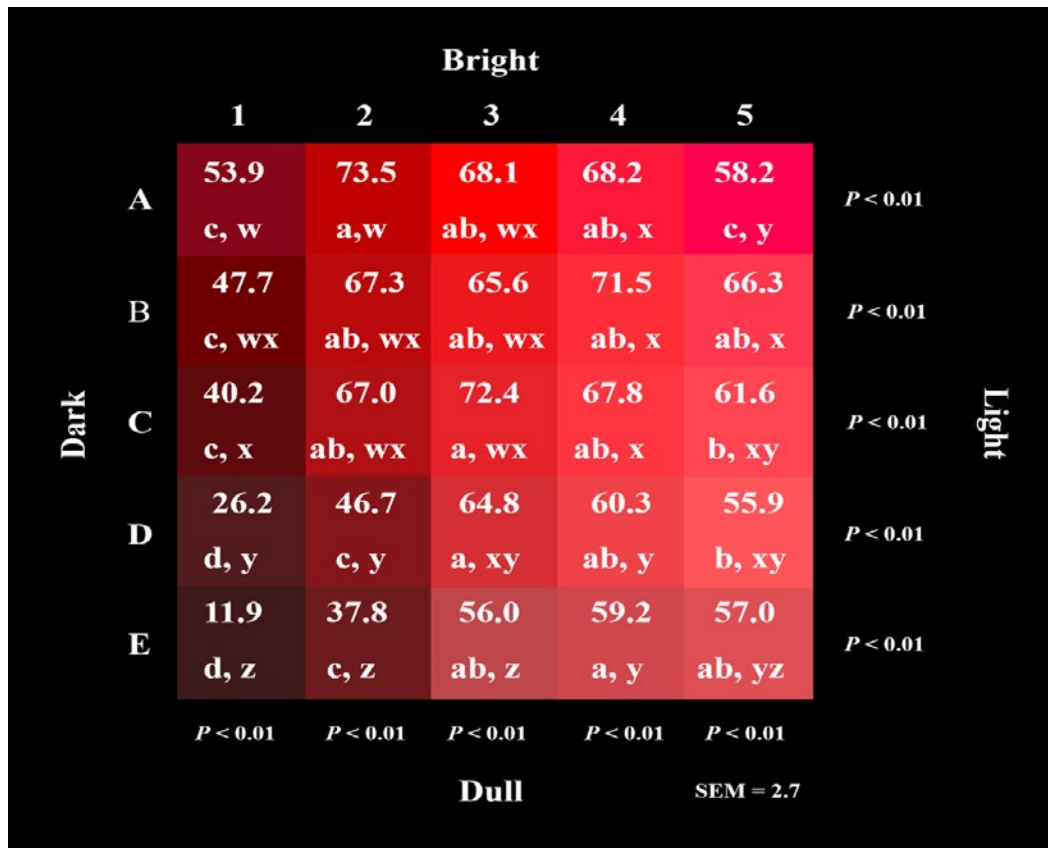


Figure 1. Consumer liking results of the various shades of beef color. Scale: 0 = extremely dislike, 100 = extremely like.

^{a-c} Least square means within the same row without a common superscript differ ($P < 0.05$).

^{w-z} Least square means within the same column without a common superscript differ ($P < 0.05$).

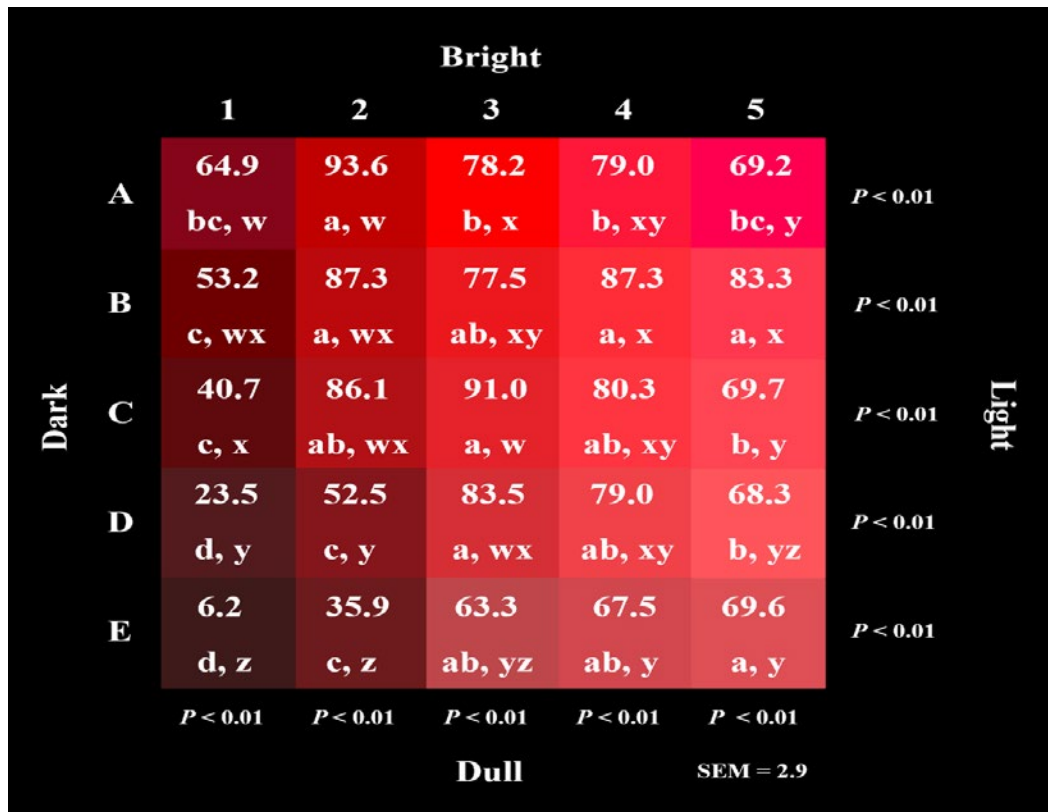


Figure 2. Consumer purchase intent results of the various shades of beef color. Values indicate percent of consumers who indicated they would purchase.

^{a-d} Least square means within the same row without a common superscript differ ($P < 0.05$).

^{w-z} Least square means within the same column without a common superscript differ ($P < 0.05$).