A Dynamic Model of Failure to Maximize Utility in the Chronic Consumer Choice to Consume Foods High in Added Sugars

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Research Objective: Model potential failures in rational utility-maximizing behavior for habitual consumption of high-added-sugar foods, informed by related economic and non-economic literatures.

A Theory Model of Time-Inconsistent Food Choice

\[
\text{Utility} = \text{Utility}_{\text{max}} = \text{Utility}_{\text{q}}(\text{enjoy q now}) + \text{Utility}_{\text{q}}(\text{later health effects of q})
\]

Basic Economic Flow-Chart Model of Decision to Purchase/Consume:

\[
\begin{align*}
\text{Utility} \mid q_{\text{max}} &= u[q] + \text{Utility}_{\text{q}}(\text{health state}) \\
\text{Utility} \mid q_{\text{max}} &= u[q] + \text{Utility}_{\text{q}}(\text{future health effects}) \\
\text{Utility} \mid q_{\text{max}} &= u[q] + \text{Utility}_{\text{q}}(\text{future health effects})
\end{align*}
\]

Quasi-exogenous Literature:
- Behavioral economics: Kahneman & Tversky; O’Donoghue & Rabin; D. Ariely; G. Gigerenzer; B. Wansink; D. Just
- Decision theory: Kahneman & Tversky; D. Ellsberg; G. Loewenstein
- Psychology: H. Simon; Kahneman & Tversky; R. Baumeister
- Consumer psychology: G. Loewenstein
- Social psychology: B. Verplanken; S. Faes
- Medicine/nutrition: V. Malik; G. Bray; F. Hu; B. Popkin; R. Johnson; Vartanian, Schwartz; & Brownell; Lustig; Schmidt & Brindis; Avena, Rada & Hoebel

Quasi-exogenous Literature Offers:
- Theories, mechanisms, clinical evidence for how and why consumer (eating) behavior breaks “rules of rationality”:
  - Quick (useful/naïve) decision-making rules (heuristics)
  - Heuristics help develop habits
  - Emotion and visceral states
  - Influence from decision/consumption environment

A Flow-Chart Model Allowing RUM or non-RUM Decision Pathways

- Feasible / attainable choice set for individual
- Buy / consume
- Do not buy / consume

References

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Q.E.D.: The final (green) equation demonstrates how an individual’s ill-informed assessment of \( k \) in deciding whether to eat \( q \) can lead to an inequality between \( \text{Utility} \mid q_{\text{max}} \) and \( \text{Utility} \mid q_{\text{max}} \). The value of \( k \) effects the expected utility of consuming \( q \), but not the realized utility assumed in the first symbolic equation. Behavior divergent from utility maximization must follow if the right hand side in the green equation is less than the right hand side in the first symbolic equation. The “correctness” of the last term in green is a function of nutrition awareness and its application in decision making in accordance with biological facts specific to the individual decision maker, because for a daily food, the consumption utility, \( u[q] \), is well-known.