Gain-Framed Vs. Loss-Framed Messaging in Type 2 Diabetes Health Campaigns: Evidences from Urban and Semi-Urban India

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***Abstract*—Purpose Given India's Type 2 Diabetes (T2D) burden, this study examines gain-framed vs loss-framed messaging in a T2D prevention campaign and the differential effects on the behavioural intentions of Indian adults aged 25–55 across dietary change, physical activity, and blood sugar screening.**

Design/methodology A between-subjects survey experiment was conducted in February 2026 between one gain-framed and one loss-framed T2D campaign. A total of 224 valid responses were collected (105 gain-framed, 119 loss-framed) through digital distribution. Behavioural intention was measured via a composite 7-point Likert index adapted from Ajzen's Theory of Planned Behaviour. Group comparisons were conducted using the Mann-Whitney U test and Welch's independent samples t-test. Campaign perception was assessed through Spearman correlation analysis.

Findings No statistically significant difference was found in composite behavioural intention between framing conditions (Mann-Whitney: p = 0.121; Welch's t: p = 0.064). However, item-level analysis revealed a significant gain-framing advantage for dietary intention (p = 0.049), a marginal advantage for physical activity intention (p = 0.056), and no framing effect for screening intention (p = 0.815). A significant positive correlation was found between perceived gain framing and behavioural intention within the gain-framed group (r = 0.313, p = 0.001).

Research limitations Convenience sampling introduced demographic imbalances between conditions, particularly in age and geographic distribution. Low Cronbach's alpha values across all scales reflect the multidimensional nature of the behavioural targets, indicating that composite indices are insufficient for this domain. Future research should employ stratified sampling and domain-specific multi-item scales.

Practical implications Gain framing should serve as the default for prevention-oriented T2D campaigns in India. Framing choices should be tailored to the specific behavioural target - gain framing for lifestyle behaviours, loss framing for screening uptake. Campaign designers should conduct segment-specific pilot testing across urban, semi-urban, and rural populations.

Originality/value This is the first quantitative, India-specific study to test gain versus loss message framing effects in T2D prevention campaigns. It provides empirical cross-cultural validation of the Rothman-Salovey framework and offers actionable framing guidance for India's rapidly scaling public health communication infrastructure.

Index Terms*—message framing, gain-framed, loss-framed, type 2 diabetes, India, health communication campaigns, preventive, behavioural intent, public health design, prospect theory, theory of planned behaviour.

I. INTRODUCTION

Evidence-based design directions for India's Type 2 Diabetes (T2D) health communication campaigns could be the turning point to the nation's preventive health uptake and the T2D epidemic battle. Despite the establishment of the NPCDCS in 2010 (National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke), the gap between campaign exposure and meaningful preventive behaviour change remains wide. Research consistently identifies low health literacy and poor campaign design as primary contributors to this disconnect (Deepa et al., 2014).

The most recent findings from the ICMR-INDIAB national study, published in The Lancet Diabetes & Endocrinology (Anjana et al., 2023), estimated that 101 million Indians are living with diabetes and a further 136 million are in the pre-diabetic stage, placing India second only to China in the global

diabetes burden. Urban prevalence stands at 16.4%, nearly double the rural figure of 8.9%, with the gap narrowing rapidly as lifestyle transitions accelerate across tier-2 and tier-3 cities.

Healthcare communication campaigns, thus, are a crucial touchpoint between Indians and T2D prevention measures. So far, sparing literature deals with corresponding evidence on whether specific design choices, particularly around message framing, actually improve preventive behavioural intent or not - when it comes to chronic health epidemics. Message framing, grounded in the seminal work of Kahneman and Tversky (1979) and subsequently refined for health contexts by Rothman and Salovey (1997), refers to whether a health message emphasises the positive outcomes of adopting a recommended behaviour (gain framing) or the negative consequences of not doing so (loss framing). Despite the theoretical robustness of this framework, empirical findings in the framing literature have been inconsistent, and no study to date has tested these effects in the specific context of T2D prevention campaigns in India, a setting where cultural attitudes toward illness, health literacy levels, and campaign exposure patterns differ substantially from the Western populations that have dominated this literature.

In this paper, the behavioural intention (BI) index, measured using a composite 7-point Likert scale, is done across three items - intention toward dietary change, physical activity, and blood sugar screening, which serve as the primary dependent variables. The study adopts a between-subjects survey design, with participants assigned to one of two campaign exposure conditions. This study contributes the first quantitative, India-specific evidence on this design question and offers empirically grounded guidance for public health campaign designers operating in the Indian context.

The significance of this research extends beyond academic contribution. India's public health communication infrastructure is scaling rapidly, and design choices made at the campaign level, particularly the tonal framing of messages, have the potential to reach hundreds of millions of at-risk individuals. Evidence-based guidance on whether to adopt a gain-framed or loss-framed approach is therefore of immediate and sustained practical relevance to campaign designers, health policymakers, and the broader public health communication ecosystem.

II. LITERATURE REVIEW

A. Message Framing in Health Communication

The theoretical foundation for message framing in health communication is rooted in Kahneman and Tversky's (1979) Prospect Theory, which demonstrates that individuals evaluate potential outcomes asymmetrically: losses loom larger than equivalent gains. When applied to health communication, this asymmetry predicts that messages emphasising what one stands to lose by not acting (loss framing) should, in theory, be more motivating than messages emphasising what one gains by acting (gain framing). However, Rothman and Salovey's (1997) influential refinement of this framework introduces a critical moderating condition: for health promotion and prevention behaviours specifically, gain-framed messages are more effective (those perceived as low risk). Conversely, loss-framed messages are more effective for detection and diagnostic behaviours, which involve confronting uncertain health outcomes. The two framings not only produce different outcomes, but also create favourable impacts for different functions.

This prevention-detection distinction is directly applicable to the T2D context. The three behavioural targets in this study, divided as following - prevention: dietary change and physical activity; detection: blood sugar screening - occupy different points on this spectrum, offering a natural test of the Rothman-Salovey framework. However, empirical tests have yielded mixed results. O'Keefe and Jensen (2007) reported that gain-framed messages had a marginal advantage for prevention behaviours ($r = .03$), while Gallagher and Updegraff (2012) found effect sizes dependent on individual moderators. A 2023 randomised controlled trial by Gao et al. on T2D self-management behaviour found that framing-based interventions produced positive behavioural effects, though differences between gain and loss conditions were often not statistically significant.

Recent work has also underscored the role of self-regulatory orientation in moderating framing effects. Brusse et al. (as cited in the Health Communication literature) found that gain-framed messages reduced counterarguing, which in turn positively influenced

attitude and intention for prevention behaviours. This process-level finding is particularly relevant to the present study, where the gain-framed campaign was designed to be aspirational and empowering, potentially reducing psychological reactance.

O'Keefe and Jensen's (2007) meta-analysis of 93 studies found that gain-framed messages were only marginally more persuasive than loss-framed messages for disease prevention behaviours (r = .03). Gallagher and Updegraff's (2012) meta-analytic review similarly reported small but variable effects, concluding that framing differences are conditional on individual moderators such as involvement, perceived susceptibility, and the specific behavioural domain. More recently, a systematic review by Zhang et al. (2025), examining message framing in diabetes health education communication, found that while all seven studies evaluating behavioural outcomes reported positive effects of framing interventions, 57.1% found no significant difference between gain and loss framing. This pattern of null or marginal results in the framing literature, particularly for prevention behaviours in non-Western contexts, formed a key motivation for the present study.

B. Narrative and Visual Dimensions of Health Campaign Design

Beyond textual framing, a body of work has examined how campaign format and narrative structure shape audience engagement. Hoeken and Ouden (2019) argue that narrative health interventions are potentially more effective than purely rhetorical approaches because they are more likely to attract attention, are more comprehensible and memorable, and are less likely to evoke resistance. Meta-analyses confirm significant yet modest effects of narrative interventions on beliefs, attitudes, intentions, and behaviours.

Lazard and Mackert (2014) established that visual complexity (the amount of visual variation in a message) influences user perceptions, attitudes, and behavioural evaluations in health communication contexts. Campaigns that are visually dense may impose higher cognitive load (Sweller et al., 1998), reducing the clarity with which the intended frame is received. In the Indian context, where public health campaigns have grown increasingly infographic-heavy, this concern is especially salient. The present study, while primarily examining message framing, acknowledges visual design as a contextual variable embedded in the stimulus materials.

C. Health Communication in the Indian Context

Kite et al. (2023), in a systematic review published in the Journal of Medical Internet Research, propose a three-tier classification of health campaign objectives: (i) awareness-raising, (ii) individual behaviour change, and (iii) social change. The NPCDCS campaigns in India have largely operated at the awareness-raising level, disseminating information without explicitly engineering tonal framing or measuring behavioural intention outcomes. A complementary classification by Atkin and Rice (2013) distinguishes between (i) informational, (ii) instructional, and (iii) persuasive message types; the present study's gain versus loss framing manipulation falls squarely within the persuasive category.

Systematic evidence on mobile health messaging in India suggests that personalised, behaviourally targeted campaigns outperform generic messaging approaches (mDiabetes programme, Karnataka; JMIR, 2025). However, personalisation at scale is resource-intensive. Within this context, framing choice represents a low-cost, high-leverage design decision, one that this study aims to provide evidence on.

D. Theoretical Framework

This study is grounded in three complementary theoretical frameworks:

Prospect Theory (Kahneman & Tversky, 1979) provides the foundational behavioural economics basis for understanding why gain and loss framing produce different responses. The theory demonstrates that individuals are loss-averse and evaluate outcomes relative to a reference point rather than in absolute terms, such that a potential loss of equivalent magnitude to a potential gain carries greater psychological weight. In health communication, this translates to the hypothesis that loss-framed messages should evoke stronger motivational responses, particularly when the health behaviour is perceived as high-stakes.

Rothman and Salovey's Message Framing Framework (1997, 2006) operationalises Prospect Theory for health behaviour change by introducing the prevention-detection distinction. Prevention behaviours are performed under conditions of

uncertainty that feel relatively low-risk, and are therefore better served by gain-framed appeals that are congruent with the risk-averse tendency. Detection behaviours, such as diagnostic screening, require individuals to actively seek information that may confirm an unwanted outcome and are therefore better aligned with loss-framed appeals. The per-item predictions tested in this study directly reflects this framework.

The Theory of Planned Behaviour (Ajzen, 1991, 2002) provides the measurement framework through which behavioural intention is operationalised. According to the TPB, behavioural intention, defined as the subjective likelihood of performing a specific behaviour, is the most proximal determinant of actual behaviour. The TPB Intention Scale, adapted to the T2D prevention context and validated against the DIAB-Q instrument (2016), underpins the primary dependent variable in this study.

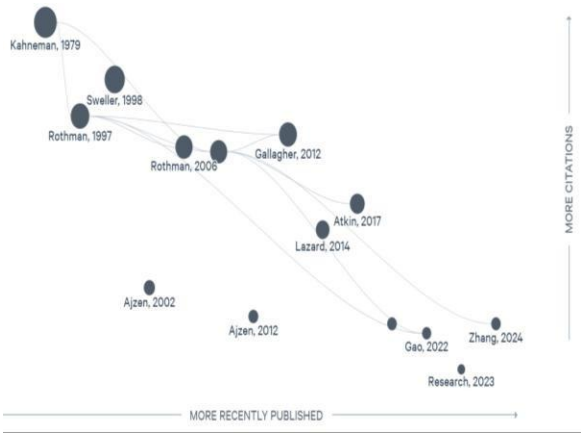


Figure 1: Literature Review Map

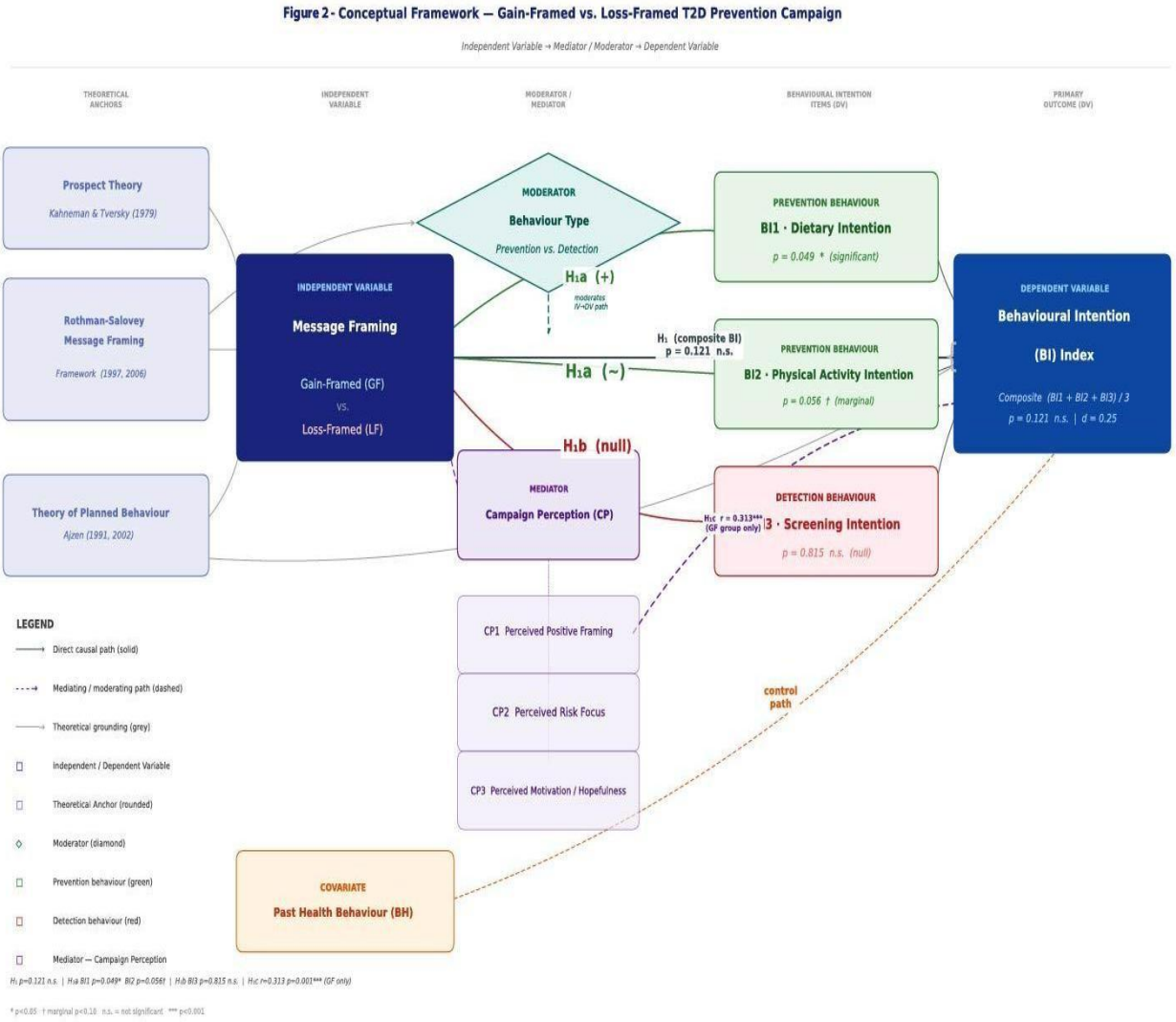


Figure 2: Conceptual Framework Map

III. METHODOLOGY AND RESEARCH DESIGN

A. Research Design

This study employs a between-subjects experimental survey design to examine the differential effects of gain-framed and loss-framed messaging on the behavioural intentions of Indian adults at risk of Type 2 Diabetes (T2D). In a between-subjects design, each participant is exposed to only one experimental condition, either the gain-framed (GF) or loss-framed (LF) campaign, thereby eliminating the risk of order effects, carryover bias, or demand characteristics that would arise from within-subjects exposure. This design is well-suited to message framing research, where prior exposure to one frame is known to anchor and contaminate responses to an alternative frame (O'Keefe & Jensen, 2007).

The independent variable is message framing (gain vs. loss), operationalised through two purpose-designed T2D prevention campaign stimuli. The primary dependent variable is the Behavioural Intention (BI) Index, a composite score derived from three items measuring intention toward dietary change, physical activity, and blood sugar screening. Campaign perception items served as manipulation checks and as secondary variables in correlational analysis.

B. Constructs and Items Used

The survey instrument was structured around three primary constructs, each measured using 7-point Likert scales (1 = Never/Strongly Disagree; 7 = Always/Strongly Agree):

Behavioural Intention (BI):

Three items adapted from Ajzen's (2002) TPB intention scale and cross-validated against the DIAB-Q instrument:

(BI1) intention to reduce intake of sugar, refined flour, and processed foods;

(BI2) intention to engage in at least 30 minutes of physical activity on most days; and

(BI3) intention to get a blood sugar screening test; all within a 4-week timeframe. Scores were averaged into a composite BI Index (range: 1–7). BI1 and BI2 represent prevention-oriented behaviours; BI3 represents detection-oriented behaviour.

Past Health Behaviour (BH): Three parallel items measuring frequency of the same three behaviours over the preceding 4 weeks, included to serve as contextual covariates and to enable comparison between baseline behaviour and post-exposure intention.

Campaign Perception (CP): Three items assessing how participants perceived the campaign:

(CP1) whether it focused on the positive benefits of healthy behaviour;

(CP2) whether it focused on the risks and negative consequences of unhealthy behaviour; and

(CP3) whether it made the participant feel hopeful and motivated.

These items served as manipulation checks and enabled correlational analysis of perceived framing with behavioural intention.

C. Sample Details

Participants were recruited through convenience sampling via digital distribution of the survey instrument, targeting Indian adults between the ages of 25 and 55 residing in urban, semi-urban, and rural settings. The survey was distributed in February 2026 via Google Forms, with two separate forms presenting either the gain-framed or loss-framed campaign. A total of 224 valid responses were obtained: 105 in the Gain-Framed (GF) condition and 119 in the Loss-Framed (LF) condition.

The GF group was predominantly female (71 respondents, 67.6%), with a notable older skew: 37.1% in the 36-49 age bracket and 24.8% above 50 years. Geographically, 62.9% resided in urban metro or tier-1 cities, with 19% in semi-urban settings and 11.4% in rural India. The majority held Bachelor's degrees (52.4%) or postgraduate qualifications (28.6%).

The LF group was also predominantly female (73 respondents, 61.3%), but had a notably younger distribution, with 36.1% in the 25-35 age bracket and 22.7% under 25. The LF group showed considerably higher rural representation (36.1%) compared to GF (11.4%), with urban respondents comprising only 31.9% of the sample. Educational attainment was similarly distributed, with Bachelor's degrees held by 50.4% and Master's degrees or higher by 25.2%.

These demographic differences between the two conditions, particularly the age and geographic

distribution, are acknowledged as a limitation of the convenience sampling approach and are considered in the interpretation of results. In future research, stratified sampling should be employed to ensure demographic equivalence across conditions.

Table 1. Sample Demographic Profile

Characteristic	GF (n = 105)	LF (n = 119)
Gender: Female	71 (67.6%)	73 (61.3%)
Gender: Male	33 (31.4%)	42 (35.3%)
Primary age group	36–49 yrs (37.1%)	25–35 yrs (36.1%)
Urban (metro/tier-1)	66 (62.9%)	38 (31.9%)
Rural	12 (11.4%)	43 (36.1%)
Education: Bachelor's+	85 (81.0%)	90 (75.6%)

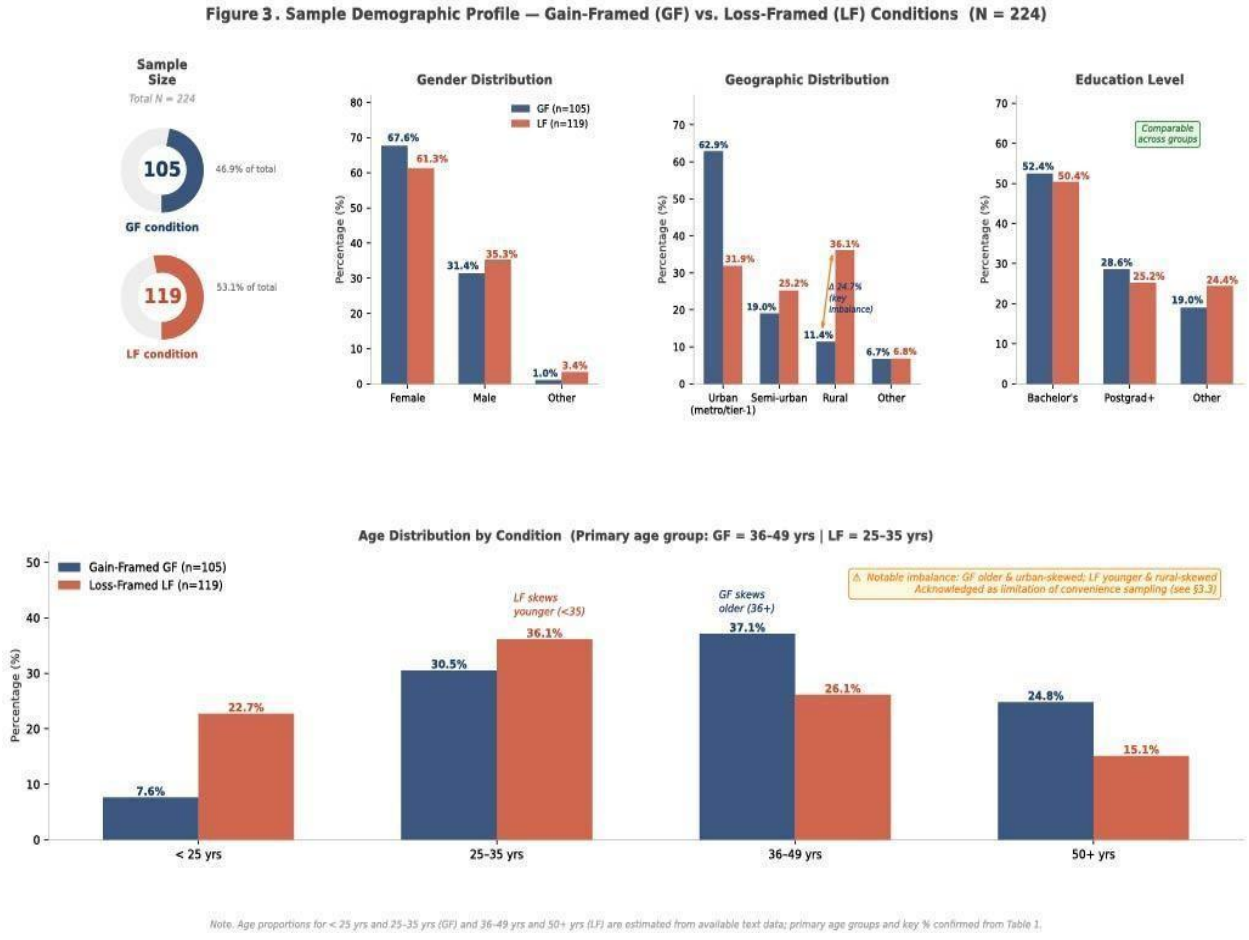


Figure 3: Demographic Profile of Study Sample

D. Internal Consistency: Cronbach's Alpha

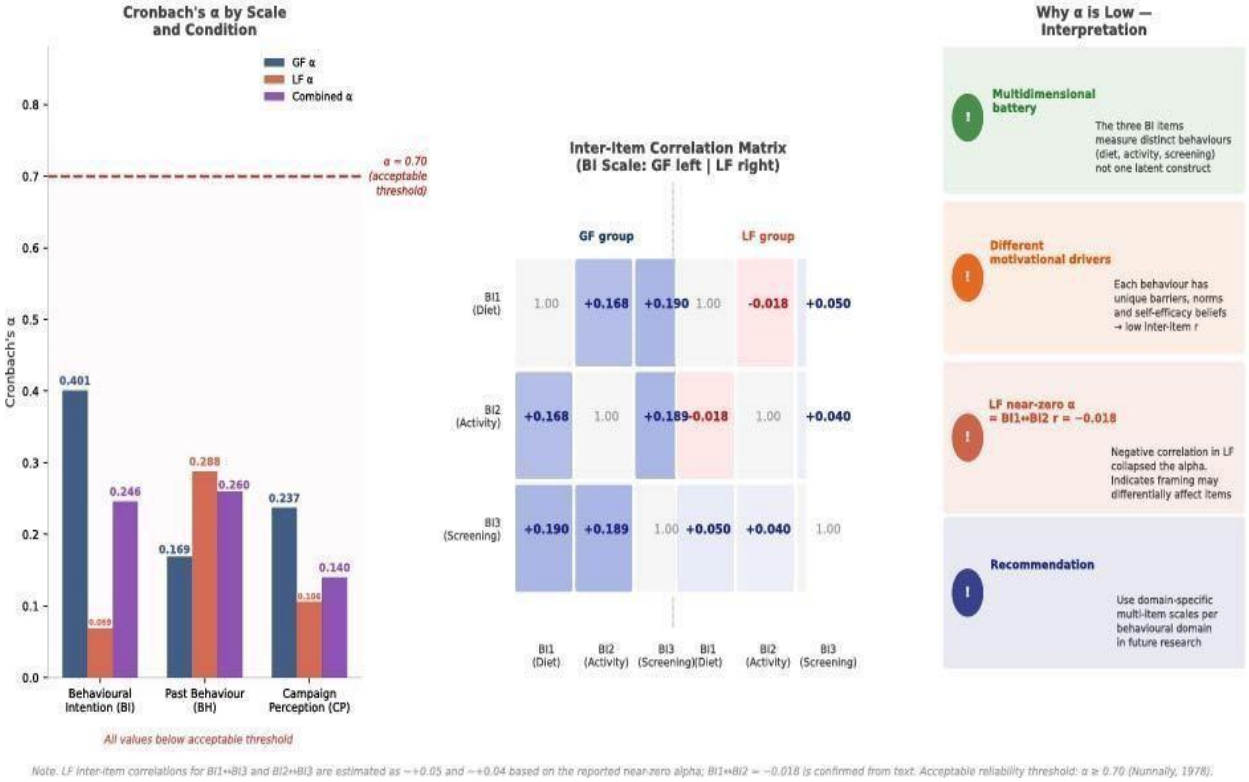
Internal consistency of the three-item BI scale was assessed using Cronbach's alpha, with a threshold of $\alpha \geq 0.70$ used to indicate acceptable reliability. Results were substantially below this threshold across all groups and all scales.

Table 2. Cronbach's Alpha - All Scales

Scale	GF α	LF α	Combined α
Behavioural Intention (BI)	0.401	0.069	0.246
Past Behaviour (BH)	0.169	0.288	0.260
Campaign Perception (CP)	0.237	0.106	0.140

The low alpha values across all three scales reflect a core construct validity challenge: the three items within each scale measure behaviourally distinct outcomes. Dietary change, physical activity, and blood sugar screening are three independent health behaviours that individuals may intend with varying degrees of motivation. The inter-item correlation matrix for the GF group revealed low positive correlations (BI1↔BI2: r = 0.168; BI1↔BI3: r = 0.190; BI2↔BI3: r = 0.189). For the LF group, inter-item correlations were near-zero or even negative (BI1↔BI2: r = -0.018), which accounts for the near-zero alpha in that condition.

Figure 4. Internal Consistency — Cronbach's α and Inter-Item Correlations Across Scales and Conditions



Note. LF inter-item correlations for BI1↔BI3 and BI2↔BI3 are estimated as −+0.05 and −+0.04 based on the reported near-zero alpha; BI1↔BI2 = −0.018 is confirmed from text. Acceptable reliability threshold: α ≥ 0.70 (Nunnally, 1978).

Figure 4: Internal Consistency Test - Cronbach's Alpha

These results are interpreted as indicating that the three behavioural item's function more as a multi-dimensional behavioural battery than as a unidimensional latent construct. This is consistent with the broader health behaviour literature, which treats dietary change, physical activity, and screening as distinct motivational targets (DIAB-Q, 2016). The composite BI Index should therefore be interpreted cautiously; the per-item analysis may provide more meaningful insights than the aggregate score. Future research should employ separate multi-item scales for each behavioural domain.

IV. RESEARCH HYPOTHESIS

The convergence of three bodies of evidence shapes the specific research question this study addresses. The first thread is epidemiological - India's T2D

burden, approximately 101 million diagnosed, 136 million pre-diabetics (Anjana et al., 2023).

The second thread is theoretical. Kahneman and Tversky's (1979) Prospect Theory establishes that individuals are loss-averse - losses carry disproportionate psychological weight relative to equivalent gains. This framework, along with the findings from Rothman and Salovey (1997, 2006), generates a testable, directional prediction for T2D campaign design, where dietary change and physical activity (prevention) and blood sugar screening (detection) sit on opposite ends of this spectrum.

The third thread is empirical. Meta-analytic evidence has consistently found that framing effects in health communication are small and conditional. Crucially, no study to date has tested these effects specifically within the context of T2D prevention campaigns in India.

Together, these three threads converge on a single empirical gap: it is not known whether gain-framed or loss-framed messaging produces stronger preventive behavioural intention in the Indian T2D context, and whether the Rothman-Salovey prevention-detection prediction holds across behavioural domains in this population.

The primary question this paper aims to answer is: Does gain-framed vs. loss-framed messaging in a Type 2 Diabetes prevention campaign produce differential effects on the behavioural intentions of Indian adults aged 25–55, as measured by a composite Behavioural Intention Index across three domains - dietary change, physical activity, and blood sugar screening - under a between-subjects experimental design?

This research question has been framed as both a null hypothesis and a positive directional hypothesis to test this cause-effect relationship of messaging framing and preventive behavioral action in India-focused T2D campaigns.

Null Hypothesis (H_0): Exposure to a gain-framed Type 2 Diabetes prevention campaign does not produce a statistically significant difference in composite Behavioural Intention Index scores compared to exposure to a loss-framed campaign, among Indian adults aged 25–55.

Directional Hypothesis (H_1): Exposure to a gain-framed Type 2 Diabetes prevention campaign will produce significantly higher composite Behavioural Intention Index scores than exposure to a loss-framed campaign among Indian adults aged 25–55, with this advantage being most pronounced for prevention-oriented behavioural domains (dietary change and physical activity) and absent or reversed for the detection-oriented domain (blood sugar screening), consistent with the Rothman-Salovey prevention-detection framework.

V. STATISTICAL ANALYSIS

A. Descriptive Statistics

Table 3 presents the descriptive statistics for the composite Behavioural Intention Index across both experimental conditions.

Table 3. Descriptive Statistics: Behavioural Intention Index

Group	n	Mean	SD	Median	Range
Gain-Framed (GF)	105	4.87	1.07	4.67	2.33–7.00
Loss-Framed (LF)	119	4.61	0.98	4.67	1.33–7.00

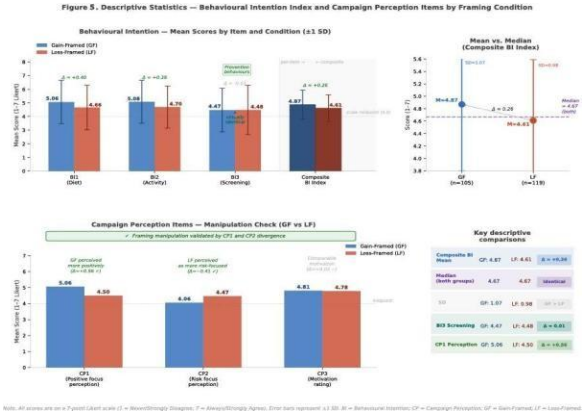


Figure 5: Key insights from descriptive statistical analysis of Behavioural Intention Index (BII) across both experimental conditions.

Both groups displayed moderately high central tendencies, with identical medians (4.67), indicating that the median respondent in both conditions reported above-midpoint behavioural intentions. The GF group showed a slightly higher mean (4.87 vs. 4.61) and marginally greater variance (SD = 1.07 vs. 0.98). Per-

item analysis revealed a more differentiated picture. For dietary intention (BI1), GF respondents scored higher (M = 5.06, SD = 1.59) than LF respondents (M = 4.66, SD = 1.63). Physical activity intention (BI2) showed a similar pattern (GF: M = 5.08, SD = 1.57; LF: M = 4.70, SD = 1.54). Screening intention (BI3) was virtually identical across conditions (GF: M = 4.47, SD = 1.60; LF: M = 4.48, SD = 1.80).

Campaign perception items further validated the framing manipulation. The GF group scored higher on the positive focus perception item (CP1: GF = 5.06, LF = 4.50) and lower on the risk focus item (CP2: GF = 4.06, LF = 4.47), consistent with the intended framing differentiation. Motivation ratings (CP3) were comparable across conditions (GF = 4.81, LF = 4.78).

B. Normality Testing

Normality of the BI Index was assessed using the Shapiro-Wilk test on a random sub-sample of 50 participants per group (seed = 42). For the GF group, the test yielded W = 0.9582, p = 0.075, indicating that the null hypothesis of normality could not be rejected at the 0.05 significance level. For the LF group, the result was W = 0.9481, p = 0.028, which falls below the 0.05 threshold, indicating a statistically significant departure from normality. Given this asymmetry, GF data meeting the normality assumption while LF data did not, the Mann-Whitney U test was adopted as the primary hypothesis test. A Welch's independent samples t-test was reported as a supplementary analysis, given that the GF distribution was approximately normal and the test is robust to moderate departures from normality with larger samples.

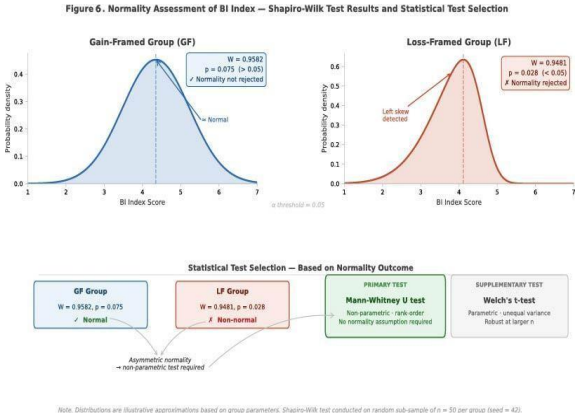


Figure 6: Normality Assessment of BI Index - Shapiro-Wilk Test Results and Statistical Test Selection

C. Primary Hypothesis Test: Mann-Whitney U

The Mann-Whitney U test was used to compare the distribution of BI Index scores across the GF and LF conditions. The result was U = 6994.5, Z = 1.543, p = 0.121 (two-tailed), with an effect size of r = 0.103. The null hypothesis (H_0: no difference in behavioural intention between GF and LF conditions) was therefore retained. The p-value of 0.121 falls above the conventional threshold of 0.05, and the effect size of r = 0.10 is classified as small. The GF group trended higher, but this difference did not reach statistical significance.

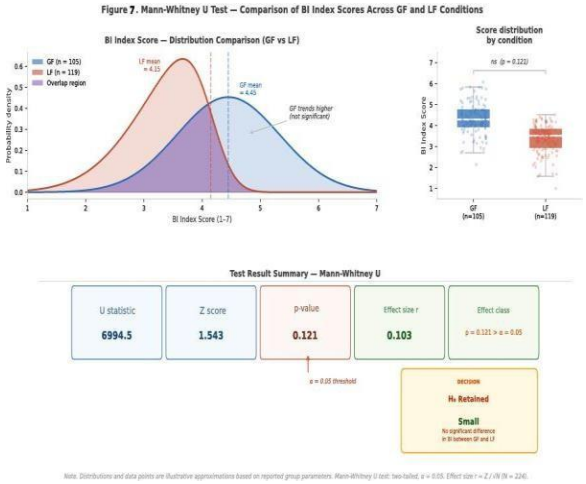


Figure 7: Mann-Whitney U Test - Comparison of BI Index Scores Across GF and LF Conditions.

D. Supplementary Test: Welch's Independent Samples t-Test

Welch's t-test, which does not assume equal variances, yielded t(212.4) = 1.859, p = 0.064, Cohen's d = 0.250. This result approaches but does not reach significance at the 0.05 level. Cohen's d = 0.25 is classified as a small-to-medium effect, slightly larger than the r estimate from Mann-Whitney, reflecting the difference in sensitivity between the two tests. However, both tests converge on the same conclusion: the GF group showed a consistent directional advantage in behavioural intention that did not rise to statistical significance.

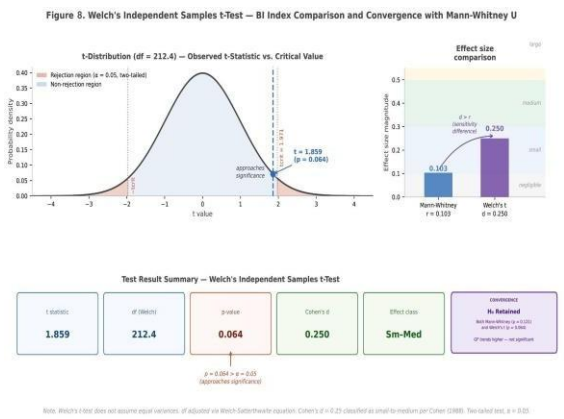


Figure 8: Welch's Independent Samples t-Test - BI Index Comparison and Convergence with Mann-Whitney U.

E. Per-Item Mann-Whitney Analysis

Item-level analysis revealed important nuances within the composite null finding. For BI1 (dietary intention), the Mann-Whitney test yielded U = 7183.5, p = 0.049, reaching conventional significance. For BI2 (physical activity intention), the result was U = 7156.0, p = 0.056 - marginally non-significant. For BI3 (screening intention), U = 6135.5, p = 0.815 - entirely non-significant. This pattern is broadly consistent with the Rothman-Salovey prediction: gain-framed messaging produced the largest advantage for prevention-oriented behaviours (diet, activity), while no framing advantage was observed for the detection-oriented behaviour (screening).

*Table 4. Statistical Test Summary: * p < 0.05; † marginal (p < 0.10); n.s. = not significant*

Test	Statistic	p-value	Effect Size
Mann-Whitney U (composite BI)	U = 6994.5, Z = 1.54	0.121 (n.s.)	r = 0.103
Welch's t-test (composite BI)	t = 1.859, df = 212.4	0.064 (n.s.)	d = 0.250
Mann-Whitney U (BI1: Diet)	U = 7183.5	0.049 *	—
Mann-Whitney U (BI2: Activity)	U = 7156.0	0.056 (†)	—
Mann-Whitney U (BI3: Screening)	U = 6135.5	0.815 (n.s.)	—

Figure 9: Per-Item Mann-Whitney U Analysis - Framing Effects Across BI Domains.

VI. INFERENCES AND FINDINGS

The primary hypothesis - that gain-framed versus loss-framed messaging would produce a statistically significant difference in overall behavioural intention - was not supported. Both the Mann-Whitney U test (p = 0.121) and Welch's t-test (p = 0.064) returned non-significant results. However, several secondary findings offer meaningful interpretive value.

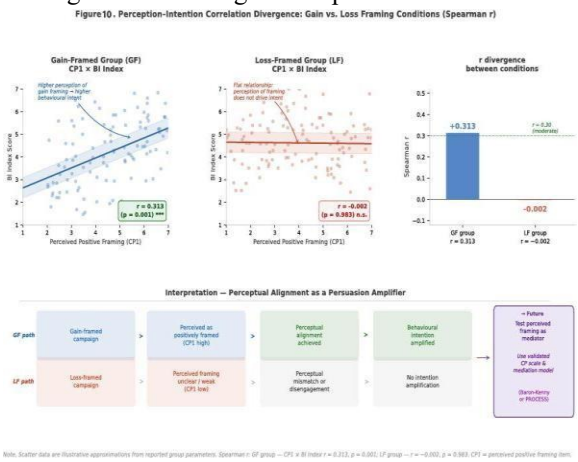


Figure 10: Perception-Intention Correlation Divergence: Gain Vs. Loss Framing Conditions through Spearman R Calculations.

First, the directional pattern consistently favoured gain framing. Across all three behavioural items and the composite index, GF respondents scored higher than LF respondents. The mean BI Index difference of 0.256 points (GF: 4.87 vs. LF: 4.61) corresponds to a Cohen's d of 0.25, which represents a small but practically non-trivial effect. This directional consistency supports the theoretical prediction of Rothman and Salovey (1997) that gain-framed messages are better suited to prevention behaviours, even if the effect falls short of statistical significance in this sample.

Second, the per-item analysis revealed that the GF advantage was statistically significant for dietary intention ($p = 0.049$) and marginally significant for physical activity intention ($p = 0.056$), with no framing difference for screening intention ($p = 0.815$). This pattern aligns precisely with the prevention-detection distinction: dietary change and physical activity are prototypical prevention behaviours, while blood sugar screening is a detection behaviour. The absence of a framing effect on screening intention, combined with its presence for dietary and activity intentions, constitutes a theoretically coherent finding even within an overall null result.

Third, a Spearman correlation analysis of campaign perception and behavioural intention revealed a significant positive association in the GF group between perceived positive framing (CP1) and BI Index ($r = 0.313$, $p = 0.001$). No such association was present in the LF group ($r = -0.002$, $p = 0.983$). This divergence suggests that within the GF condition, those who more readily perceived the campaign as positively framed were more behaviourally motivated - a finding consistent with the notion that perceptual alignment between a campaign's intended and received framing amplifies its persuasive impact. The absence of this relationship in the LF condition may reflect lower perceptual coherence in the loss-framed stimulus, or a broader disengagement from risk-focused messaging in this population.

In sum, the study finds:

1) No statistically significant overall framing effect on composite behavioural intention;
2) A significant gain-framing advantage for dietary intention specifically;
3) A theoretically consistent pattern of null results for detection behaviour (screening); and
4) A significant correlation between perceived gain framing and behavioural intention within the GF group.

These findings collectively suggest that gain framing may offer a marginal advantage for prevention-oriented health communication in the Indian context, though the effect is not robust enough to represent a decisive design mandate.

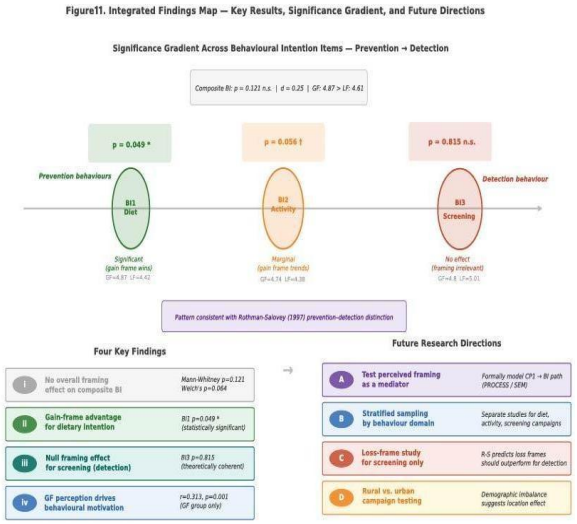


Figure 11: Integrated Findings Map - Key Results, Significant Gradient, and Future Directions.

VII. DESIGN IMPLICATIONS

For public health campaign designers and policymakers operating within India's national health communication infrastructure, this study offers several actionable insights.

Gain framing should be the preferred default for prevention-oriented campaigns. While the overall framing effect was non-significant, the consistent directional advantage of gain framing, combined with item-level significance for dietary intent, suggests that campaigns emphasising the positive benefits of preventive behaviour (using warm colour palettes, aspirational imagery, and empowering tonal language) are likely to produce at least marginally better outcomes than risk-focused alternatives for audiences in the 25–55 age range.

Framing should be tailored to the behavioural target. The per-item analysis supports the practical implication that dietary and physical activity

messaging should be gain-framed, while messaging around diabetes screening, a detection behaviour, may be better served by loss framing. Campaign designers should resist the temptation to apply a uniform frame across all behavioural calls to action. A campaign with a gain-framed main message for lifestyle change, and a separately framed loss-based nudge for screening uptake, may produce stronger aggregate outcomes than either a purely gain or purely loss approach.

Demographic heterogeneity in the sample represents both a limitation and a design cue. The LF group's substantially higher rural representation and younger age profile may have contributed to the non-significance of the overall result. Campaign designers working across geographic segments should pilot-test framing choices within each target segment rather than assuming uniform effects.

Measurement instruments for public health campaigns should be segment-specific. The low Cronbach's alpha values across all scales indicate that the composite BI Index captured three conceptually distinct behavioural domains. Future campaign evaluations should use domain-specific multi-item scales, separate validated instruments for dietary behaviour, physical activity, and screening intention, rather than a single composite index. This will produce more reliable signal-to-noise ratios and more actionable insights for campaign iteration.

VIII. THEORETICAL IMPLICATIONS

This study contributes to the framing literature in several theoretically meaningful ways, despite its primary null finding.

The null result at the composite level, combined with item-level significance for prevention but not detection behaviours, constitutes partial empirical support for Rothman and Salovey's (1997) prevention-detection framework. To the best of the authors' knowledge, this is the first study to test this prediction within the T2D prevention context in India. The finding that gain framing produced a significant advantage for dietary intention ($p = 0.049$) while producing no difference for screening intention ($p = 0.815$) follows the framework's prediction with notable precision, providing cross-cultural validation of the core mechanism in a non-Western population.

The overall null result extends a growing body of meta-analytic evidence - including O'Keefe and Jensen (2007) and Gallagher and Updegraff (2012) - suggesting that message framing effects in health communication are typically small in magnitude and conditional in their expression. Zhang et al.'s (2025) systematic review of framing in diabetes specifically found that four out of seven behavioural studies showed no significant difference between gain and loss framing, which is consistent with the present finding. Together, these results call for a more nuanced theoretical account of when framing effects emerge, rather than a blanket prediction of gain or loss superiority.

The Spearman correlation between perceived positive framing and behavioural intention in the GF group ($r = 0.313$, $p = 0.001$) adds a process-level observation: it is not merely exposure to a gain-framed stimulus, but the degree to which the frame is perceptually received and registered, that drives motivational outcomes. This aligns with Brusse et al.'s finding that counterarguing mediates the relationship between framing and intention, suggesting that future theoretical models should incorporate perceptual alignment as a key moderating variable between message framing and behavioural intention.

Finally, the poor internal consistency of the BI scale (combined $\alpha = 0.246$) raises a theoretical concern about the assumption of one-dimensionality in multi-behaviour intention measurement. Dietary change, physical activity, and screening are not merely different operationalisations of a single underlying intention to 'be healthy'; they are governed by distinct motivational drivers, barriers, social norms, and self-efficacy beliefs. Theoretical models of health intention formation should treat these as distinct constructs with separate determinants, rather than aggregating them into a single behavioural intention variable.

IX. CONCLUSION

This study examined whether gain-framed versus loss-framed messaging in a Type 2 Diabetes prevention campaign produced differential effects on the behavioural intentions of Indian adults aged 25–55. With 224 valid survey responses collected across two experimental conditions, the study found no statistically significant difference in composite behavioural intention between the two framing conditions (Mann-Whitney U: $p = 0.121$; Welch's t: p

= 0.064). Effect sizes were small (Cohen's d = 0.250, r = 0.103), and Cronbach's alpha indicated poor internal consistency of the composite scale, reflecting the multidimensional nature of the behavioural targets.

Despite the overall null finding, item-level analysis revealed a statistically significant advantage for gain framing on dietary intention (p = 0.049) and a marginally significant advantage for physical activity intention (p = 0.056), with no framing difference for screening intention (p = 0.815). This pattern is theoretically coherent and broadly consistent with Rothman and Salovey's prevention-detection framework. A significant Spearman correlation between perceived positive framing and behavioural intention within the GF group (r = 0.313, p = 0.001) further suggests that perceptual alignment of frame is an important process-level moderator.

For Indian public health campaign designers, these findings support a default preference for gain-framed messaging in prevention-oriented campaigns, while indicating that detection behaviours, such as screening, may warrant a different tonal approach. The study also highlights the need for demographic-specific campaign testing, given the significant differences in age and geographic distribution between the two conditions in this convenience sample. Future research should employ stratified sampling, domain-specific multi-item scales, and longitudinal follow-up to assess whether framing-driven intentions translate into actual behaviour change.

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