

# EFFECTS OF PROHIBITIVE AND WARNING TRAFFIC SIGNS DESIGN ON DRIVERS' SUBJECTIVE PREFERENCE AND VISUAL PERFORMANCE

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## ABSTRACT

PROHIBITIVE AND WARNING SIGNS ARE TWO MAJOR TRAFFIC SIGNS USED TO INTRODUCE TRAFFIC INFORMATION TO DRIVERS. BECAUSE PROHIBITIVE TRAFFIC SIGNS PROVIDE PROHIBITIVE INFORMATION BY NEGATIVELY PRESENTED CONCEPT AND WARNING TRAFFIC SIGNS PROVIDE WARNING INFORMATION BY SYMBOL IN THE TRIANGULAR FRAME, THE EFFECT OF PROHIBITIVE AND WARNING TRAFFIC SIGNS DESIGN ON USERS' SUBJECTIVE PREFERENCE AND VISUAL PERFORMANCE DESERVES TO BE DISCUSSED FURTHER. THIS STUDY INCLUDES TWO EXPERIMENTS. A PREFERENCE-RATING TEST WAS HELD IN STAGE I OF EXPERIMENT I TO INVESTIGATE THE PROHIBITIVE TRAFFIC SIGNS EFFECTS OF SIGN-TYPE (TWELVE TYPES) AND SLASH-TYPE (A SLASH OVER THE SYMBOL, A SLASH UNDER THE SYMBOL, A PARTIAL SLASH, AND A TRANSLUCENT SLASH) ON THE SUBJECTS' SUBJECTIVE PREFERENCE. ANALYSIS OF RESULTS SHOWED THAT SUBJECTS SHOWED THE WORST PREFERENCE ON SIGNS WITH TRANSLUCENT SLASH AND PARTIAL SLASH. ADDITIONALLY FOR SIGN 1, SIGN 2, SIGN 7, SIGN 8 AND SIGN 9, SUBJECTS PERFORMED NO SIGNIFICANT DIFFERENT PREFERENCE ON SIGNS WITH OVER SLASH AND UNDER SLASH. HOWEVER FOR SIGN 3, SIGN 4, SIGN 11 AND SIGN 12, SUBJECTS SHOWED SIGNIFICANTLY BETTER PREFERENCE ON SIGNS WITH UNDER SLASH THAN SIGNS WITH OVER SLASH, AND SUBJECTS SHOWED NO SIGNIFICANTLY DIFFERENT PREFERENCE ON SIGNS WITH OVER SLASH, TRANSLUCENT SLASH, AND PARTIAL SLASH FOR SIGN 5 AND SIGN 10. A DRIVING SIMULATING EXPERIMENT WAS DEVELOPED IN STAGE II OF EXPERIMENT I TO EVALUATE THE PROHIBITIVE TRAFFIC SIGNS EFFECTS OF SIGN-TYPE, SLASH-TYPE, AGE (A YOUNG GROUP, A MIDDLE-AGED GROUP, AND AN ELDERLY GROUP), ILLUMINANCE CONDITIONS (DAYLIGHT AND DUSK) AND DRIVING VELOCITY (40 AND 60 KM/HR) ON THE SUBJECTS' VISUAL PERFORMANCE. ANALYSIS OF RESULTS SHOWED THAT SIGN TYPE, SLASH TYPE, ILLUMINANCE CONDITIONS, AND DRIVING VELOCITY WERE ALL SIGNIFICANT FACTORS FOR THE SUBJECTS' VISUAL PERFORMANCE. SUBJECTS PERFORMED BETTER VISUAL PERFORMANCE WHEN THE PICTORIALS OF TRAFFIC SIGNS WERE SIMPLE, CLEAR AND WHEN ITS SLASH DID NOT COVER THE MAJOR PICTORIAL FEATURES OF SIGNS. SUBJECTS PERFORMED THE BEST VISUAL PERFORMANCE FOR SIGNS WITH PARTIAL SLASH; THEN UNDER SLASH AND TRANSLUCENT SLASH, AND PERFORMED THE WORST VISUAL PERFORMANCE FOR SIGNS WITH OVER SLASH. GENERALLY, YOUNG AND MIDDLE-AGED GROUPS PERFORMED SIGNIFICANTLY BETTER VISUAL PERFORMANCE THAN THE ELDERLY GROUP. THE VISUAL PERFORMANCE OF YOUNG AND MIDDLE-AGED GROUPS WAS SIGNIFICANTLY BETTER THAN THE ELDERLY GROUP FOR SIGN 4, SIGN 5, SIGN 6, SIGN 9, SIGN 10, SIGN 11 AND SIGN 12. HOWEVER FOR SIGN 1, SIGN 2, SIGN 3, SIGN 7 AND SIGN 8, YOUNG GROUP PERFORMED THE BEST VISUAL PERFORMANCE; THEN MIDDLE AGED GROUP, AND THE ELDERLY GROUP PERFORMED THE WORST VISUAL PERFORMANCE. REGARDING THE ILLUMINANCE CONDITION OF DRIVING, SUBJECTS PERFORMED BETTER VISUAL PERFORMANCE IN DAYLIGHT. THE PREFERENCE-RATING TEST WAS ALSO HELD IN STAGE I OF EXPERIMENT II TO INVESTIGATE THE WARNING TRAFFIC SIGNS EFFECTS OF SIGN-TYPE (TWELVE TYPES) AND THE SYMBOL SIZE (10%, 15%, 20%, AND 25% OF THE SIGN AREA) ON THE SUBJECTS' SUBJECTIVE PREFERENCE. ANALYSIS OF RESULTS SHOWED THAT THE SYMBOL SIZE WAS A SIGNIFICANT FACTOR FOR THE SUBJECTS' PREFERENCE. THE 20% SYMBOL SIZE WAS THE MOST SIGNIFICANTLY PREFERRED SIGNS; THEN 25% AND 15%, AND THE 10% SYMBOL SIZE WAS THE WORST PREFERRED SIGNS DESIGN. THE DRIVING SIMULATING EXPERIMENT WAS ALSO HELD IN STAGE II OF EXPERIMENT II TO EVALUATE THE WARNING TRAFFIC SIGNS EFFECTS OF SIGN-TYPE, THE SYMBOL SIZE, AGE (A YOUNG GROUP, A MIDDLE-AGED GROUP, AND AN ELDERLY GROUP), ILLUMINANCE CONDITIONS (DAYLIGHT AND DUSK) AND DRIVING VELOCITY (40 AND 60 KM/HR) ON THE SUBJECTS' VISUAL PERFORMANCE. ANALYSIS OF RESULTS SHOWED THAT SIGN TYPE, THE SYMBOL SIZE, ILLUMINANCE CONDITIONS, AND DRIVING VELOCITY WERE ALL SIGNIFICANT FACTORS FOR THE SUBJECTS' VISUAL PERFORMANCE. SUBJECTS PERFORMED BETTER VISUAL PERFORMANCE WHEN THE SYMBOLS OF TRAFFIC

SIGNS WERE SIMPLE, CLEAR AND WITH APPROPRIATE INTERVAL BETWEEN THE SYMBOL AND THE TRIANGULAR FRAME. GENERALLY, YOUNG AND MIDDLE-AGED GROUPS PERFORMED BETTER VISUAL PERFORMANCE THAN THE ELDERLY GROUP. ADDITIONALLY, YOUNG AND MIDDLE-AGE GROUPS PERFORMED THE BEST VISUAL PERFORMANCE ON SIGNS WITH 20% AND 25% SYMBOL SIZES; THEN 15% SYMBOL SIZE, AND PERFORMED THE MOST VISUAL PERFORMANCE ON SIGNS WITH 10% SYMBOL SIZE. HOWEVER, ELDERLY GROUP SHOWED THE BEST VISUAL PERFORMANCE ON SIGNS WITH 20% SYMBOL SIZE; THEN 25% AND 15% SYMBOL SIZES; AND PERFORMED THE WORST VISUAL PERFORMANCE ON SIGNS WITH 10% SYMBOL SIZE. REGARDING THE ILLUMINANCE CONDITION OF DRIVING, SUBJECTS PERFORMED BETTER VISUAL PERFORMANCE IN DAYLIGHT.

Keywords : PROHIBITIVE TRAFFIC SIGNS, TYPES OF CIRCLE SLASH, WARNING TRAFFIC SIGNS, SYMBOL SIZE, SUBJECTIVE PREFERENCE, VISUAL PERFORMANCE

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