UNRAVELING THE IMPACT OF STEREOSCOPIC VISION ON DAILY TASKS IN YOUNGER AND OLDER ADULTS

ADRIEN CHOPIN 1,2 DIANA RDEINI 1,3 CATHERINE AGATHOS 2 CHIARA CIUCCI 1,4 YULING WANG 1 VALERIE PARMENTIER 3 DENIS SHEYNIKHOVICH 1 ANGELO ARLEO 1,5
1Institut de la Vision, Sorbonne Université, INSERM, CNRS, Paris 2Smith–Kettlewell Eye Research Institute, San Francisco 3Hôpital National de la Vision, Université Paris Cité, Paris 4School of Advanced Study Sant’Anna, Pisa University, Pisa 5Center Innovation & Technologies Europe, Essilor International (EssilorLuxottica), Paris

OH NO! HOW DID I MISS?! REALITY? ARE YOU STEREOBLIND? WHAT IS THAT? I DON’T KNOW. WHY DO YOU ASK?

IT IS WHEN YOU CANNOT USE STEREO, WHICH IS THE EXTRACITION OF DEPTH FROM THE VIEWPOINT DIFFERENCE BETWEEN THE TWO EYES.

INTERESTING BUT WOULD THAT REALLY TRANSLATE INTO EVERYDAY LIFE [2]?

WELL, A TEAM IN PARIS JUST STUDIED THAT AND THEY CLAIM THAT IT DOES.

THE FIRST TASK WAS TO PREPARE COFFEE WITH A DRIp MACHINE... THE SECOND WAS TO SET THE TABLE FOR FOUR.

THEY HAD TWO GROUPS TO STUDY AGING: 16 YOUNGER AND 16 OLDER ADULTS.

TO MEASURE THE EFFECT OF STEREO, THEY COMPARED TWO CONDITIONS: MONOCULAR AND BINOCULAR.

THEY COMPARED GENERALIZED LINEAR MIXED EFFECT MODELS WITH FACTORS LIKE STEREO CONDITION, AGE GROUP AND CERTAIN INTERACTIONS. THEN THEY SELECTED THE BEST MODEL (BEST AIC, WITH NORMAL RESIDUALS AND HOMOGENEITY OF VARIANCE).

THEY ADJUSTED P-VALUES FOR MULTIPLE COMPARISONS USING THE HOCHBERG-BENJAMINI PROCEDURE.

THEY PUT EIGHT MOTION CAPTURE CAMERAS IN A CONTROL APARTMENT... AND THEY RECORDED PEOPLE’S HAND MOVEMENTS AND TIME TO COMPLETE TWO DIFFERENT DAILY LIVING TASKS.

STEREO WAS ASSOCIATED WITH TIME SAVINGS THAT WERE STRONGER FOR OLDER THAN YOUNGER ADULTS (P = 0.0001, COHEN'S D = 0.5, MEDIUM SIZE).

MEDIAN TIME SAVINGS WERE 5% FOR YOUNGER AND 10% FOR OLDER ADULTS.

SO STEREO DECREASES TIME TO COMPLETE DAILY LIVING TASKS...

...AND MORE SO FOR OLDER ADULTS... BUT NOT SMOOTHNESS!

SO MAYBE WE COULD TRAIN OLDER ADULTS’ STEREO TO IMPROVE THEIR DAILY LIFE?

OH NO! HOW DID I MISS?! REALLY? ARE YOU STEREOBLIND? WHAT IS THAT? I DON’T KNOW. WHY DO YOU ASK?

IT IS WHEN YOU CANNOT USE STEREO, WHICH IS THE EXTRACITION OF DEPTH FROM THE VIEWPOINT DIFFERENCE BETWEEN THE TWO EYES.

INTERESTING BUT WOULD THAT REALLY TRANSLATE INTO EVERYDAY LIFE [2]?

WELL, A TEAM IN PARIS JUST STUDIED THAT AND THEY CLAIM THAT IT DOES.

THE FIRST TASK WAS TO PREPARE COFFEE WITH A DRIp MACHINE... THE SECOND WAS TO SET THE TABLE FOR FOUR.

THEY HAD TWO GROUPS TO STUDY AGING: 16 YOUNGER AND 16 OLDER ADULTS.

TO MEASURE THE EFFECT OF STEREO, THEY COMPARED TWO CONDITIONS: MONOCULAR AND BINOCULAR.

THEY COMPARED GENERALIZED LINEAR MIXED EFFECT MODELS WITH FACTORS LIKE STEREO CONDITION, AGE GROUP AND CERTAIN INTERACTIONS. THEN THEY SELECTED THE BEST MODEL (BEST AIC, WITH NORMAL RESIDUALS AND HOMOGENEITY OF VARIANCE).

THEY ADJUSTED P-VALUES FOR MULTIPLE COMPARISONS USING THE HOCHBERG-BENJAMINI PROCEDURE.

THEY PUT EIGHT MOTION CAPTURE CAMERAS IN A CONTROL APARTMENT... AND THEY RECORDED PEOPLE’S HAND MOVEMENTS AND TIME TO COMPLETE TWO DIFFERENT DAILY LIVING TASKS.

STEREO Was ASSOCIATED With TIME SAVINGS THAT WERE STRONGER FOR OLDER THAN YOUNGER ADULTS (P = 0.0001, COHEN'S D = 0.5, MEDIUM SIZE).

MEDIAN TIME SAVINGS WERE 5% FOR YOUNGER AND 10% FOR OLDER ADULTS.

SO STEREO DECREASES TIME TO COMPLETE DAILY LIVING TASKS...

...AND MORE SO FOR OLDER ADULTS... BUT NOT SMOOTHNESS!

SO MAYBE WE COULD TRAIN OLDER ADULTS’ STEREO TO IMPROVE THEIR DAILY LIFE?

WAIT, I WOULD EXPECT IT GIVEN THAT THE VISUAL FIELD IS LARGER IN THE BINOCULAR CONDITION...

I SEE. THEY TRACKED HANDS. DOES STEREO AFFECT HAND SPEED?

NO...THEY USED A PROCEDURE TO CONSTRAIN THE VISUAL FIELDS SO THAT THEY WERE EQUAL IN THE TWO CONDITIONS.

indeed! stereo was associated with slightly larger hand velocities (median = 5%, P = 0.025, COHEN'S D = 0.2).

they looked at smoothness (3) but stereo did not significantly affect it.

load had a small effect on completion time, hand velocity and smoothness but that was independent of stereo...

so stereo decreases time to complete daily living tasks...

...and more so for older adults...

TO SMOOTHLY...

WHAT ABOUT VISUAL SPATIAL LOAD?

lODI HAD A SMALL EFFECT ON COMPLETION TIME, HAND VELOCITY AND SMOOTHNESS BUT THAT WAS INDEPENDENT OF STEREO...

SO MAYBE WE COULD TRAIN OLDER ADULTS’ STEREO TO IMPROVE THEIR DAILY LIFE?