

## THE ROLE OF ACTIVELY OPEN-MINDED THINKING AMONG COLLEGE STUDENTS AND ITS IMPACT ON FUTURE TIME PERSPECTIVES

## EL PAPEL DEL PENSAMIENTO ACTIVO DE MENTE ABIERTA ENTRE LOS ESTUDIANTES UNIVERSITARIOS Y SU IMPACTO EN SUS PERSPECTIVAS DE TIEMPO FUTURO

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### Abstract

The current study aimed to investigate the development of actively open-minded thinking (AOT) among Saudi College students and its impact on their future time perspective (FTP). The study samples included 1,797 undergraduate students from different majors, and used AOT inventory of (Stanovich & West, 1997) and a short version of Zimbardo FTP inventory. The results showed that there was no development of AOT as illustrated by linear regression among college students depending on the AOT subfactors. However, the FTP results demonstrated that there was development of the present experience (FTP

subfactor), as indicated by linear regression according to age in the present experience (FTP subfactor) was increased by age. The findings revealed a difference in the AOT, AOT subfactors, FTP and FTP subfactors in relation to sex, with males showing a higher score compared to females. In addition, the results indicated the interaction of AOT by sex on FTP subfactors (i.e., present vs. future). These findings indicate that AOT does not show developmental change according to age among the study sample. In contrast, some developmental changes occurred in FTP and FTP subfactors according to age.

**Keywords:** Actively Open-minded Thinking; Future Time Perspectives; College students; Saudi Arabia.

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## Resumen

El estudio actual tuvo como objetivo investigar el desarrollo del pensamiento de mente abierta activa (AOT) entre los estudiantes universitarios saudíes y su impacto en su perspectiva de tiempo futuro (FTP). Las muestras del estudio incluyeron 1797 estudiantes universitarios de diferentes carreras y utilizaron el inventario AOT de (Stanovich y West, 1997) y una versión corta del inventario FTP de Zimbardo. Los resultados mostraron que no hubo desarrollo de AOT como lo ilustra la regresión lineal entre estudiantes universitarios según los subfactores de AOT. Sin embargo, los resultados de FTP demostraron que hubo un desarrollo de la experiencia actual (subfactor FTP), como lo indica la regresión lineal según la edad en la experiencia actual (subfactor FTP) aumentó con la edad. Los hallazgos revelaron una diferencia en los subfactores AOT, AOT, FTP y FTP en relación con el sexo, mostrando los hombres una puntuación más alta en comparación con las mujeres. Además, los resultados indicaron la interacción de AOT por sexo en los subfactores de FTP (es decir, presente versus futuro). Estos hallazgos indican que AOT no muestra cambios en el desarrollo según la edad entre la muestra del estudio. Por el contrario, se produjeron algunos cambios de desarrollo en los subfactores FTP y FTP según la edad.

**Palabras clave:** pensamiento activo de mente abierta; perspectivas de tiempo futuro; estudiantes universitarios; Arabia Saudí.

## Introduction

Life is accelerating and requires different skills, such as Actively Open-minded Thinking (AOT), which qualifies the individuals to deal with present and future challenges. The AOT not only meets the developmental needs of individuals and society, nonetheless, it is one of multiple thinking styles providing standards for the evaluation of thinking, which plays a significant role in how humans reason the present and future issues (Svedholm-Hakkinen & Lindeman, 2018). It also allows the individuals to adapt to societal changes, during the time of the pandemics (e.g.,

COVID 19), and is associated with reducing individual biases in potential lifestyle changes (e.g., social distancing).

Moreover, this type of thinking allows the individuals to deal effectively and openly deal with challenges in present and future situations (i.e., during covid-19 online teaching and assessments were used on a large scale). According to Haran et al. (2013), AOT is characterized by intellectual maturity and the ability to be independent in thinking and openness to new experiences, which requires the acquisition of many skills. These skills are characterized by diversity and the ability to integrate between the various sources of knowledge to access credible information (Edgcumbe, 2021).

The concept of AOT is derived from the early work of Baron (1993) who investigated the main characteristics of good thinking to deal with present and future issues. He mentioned that AOT is important for two different purposes: First, AOT is beneficial to achieving goals, and formulating appropriate goals. Second, it is useful for providing a criterion for judging what is appropriate for us in the present and the future (Baron, 2019). Baron (1995) suggested that people provide evidence for AOT, in that they argue for a previously held position in thinking than they do for arguments opposing a previously held position (Toplak & Stanovich, 2003), which affects an individual's arbitration process in future issues and events. Also, AOT provides standards for assessing thinking, which apply to our own thinking versus the thinking of others (Baron, 2008).

Stanovich and West (1997) believe that AOT is viewed as a characteristic of good critical thought that includes different skills as flexibility in thinking, characterized by cognitive flexibility, open to change, and accept new experiences and a positive view about the future. Different studies on AOT showed that individuals with high AOT scores have more cognitive self-independence and mature personality than those with low AOT scores (Baron, 2019). This can be attributed to the practice of flexibility in thinking (Stanovich & West, 1997), which evaluates opinions and issues in a logic manner. Ladd (2009) found that individuals with AOT scores demonstrate the ability to analyze situations, solve problems, and accept unfamiliar

iar ideas and thoughts, as well as new possibilities that facilitates problem solving for the current issues, and help these individuals adapt to future changes.

In Haran et al. (2013) study, the authors discussed the prevalence of AOT which may depend on the degree of individual basis towards his thoughts and believes as a part of the personality and cognitive aspect. The same observation was reported in the study of Baron (2019), which indicated that AOT helps individuals to create different patterns that assist them to solve problems in an objective manner and avoid self-bias by collecting information from different sources, and considering other opinions, which contributes to making proper decisions.

Dalasio (2020), explained that individuals with AOT have the ability to make decisions by following scientific foundations, and new approaches that help them choose the most appropriate alternatives. Additionally, individuals with high AOT scores demonstrate a cognitive reflection process, which includes a set of unique cognitive processes used for decision-making in reciprocal binary ways. Several studies have developed this idea by focusing on the nature of AOT and its impact on decisions making in the present and future (Baron, 2019; Dalasio, 2020). It has been controversial in the literature whether AOT and the development of AOT may positively or negatively impact future perspectives among individuals. Consequently, the current study investigates the effect of AOT on individuals' future perspectives.

### ***The Development of AOT according to age***

Although the AOT has its merits to be a good predictor of understanding the individual future perspectives, and how the nature of good thinking may lead to improve the quality of life. The concept of AOT may vary with age, as reported in the study of (Edgcumbe, 2021), in that performance on measures of AOT decreases as individuals age. It is worth noting that the sample of above-mentioned study from age 18 to 87 years old, and it included 9,010 participants. The author observed that older adults have lower AOT performance scores compared to younger adults. He attributed these differences in AOT to a specific

mechanism driven by age differences in healthy brain and associated healthy cognitive functions, which decreases with age. Decreased AOT as a function of aging provided clear evidence for the impact of aging on AOT. Analogous to the study of (Metz, Baelen & Yu., 2020) that studied AOT among 1,551 adolescents from eight diverse public, private and charter high school academies in the USA. Data were collected for 18 months on the change in the concept of AOT between these adolescents. The study included a variety of approaches to assess AOT values and habits, including a rating scale, multiple choice measures, and teacher-to-student reports, peer nomination, and interviews with subsets of the larger sample. Participants in this study demonstrated AOT in three ways, deep search for ideas, epistemic empathy, and pluralistic thinking. Nevertheless, no change according to the school or the education system has been reported. Very limited information has been reported on the development of AOT among different individuals and groups according to age.

### ***The Development of future time Perspectives (FTP) according to age***

Future time perspectives (FTP) refer to how the individuals view their psychological future and psychological past existing at a given time (Kooij et al., 2018). The research findings show that FTP includes three different factors represented in past experience, present experience, and future experience (Cate & John, 2007; Kooij et al., 2018).

Prior research illustrated that past, present and future perspectives are distinct, and play a major role in shaping the goals, plans and self-regulatory activities. Additionally, the experience of the future time affects several key outcomes in educational settings such as student performance at the college, and their mental health (e.g., Adams & Nettle, 2009; Kooij et al., 2018).

The current research has found that there is a relationship between FTP and other outcomes such as: well-being, goal-directed behaviors, health behavior, risk taking behavior and retirement planning (Cunningham et al., 2015; Dearing et al., 2010; Stolarski et al., 2014). Moreover, different studies discussed the relationship between Age and

FTP, as mentioned in the study of Sobol-Kwapinska et al. (2019) that investigated the effect of FTP in different age groups (18-78 years). A total of 2,789 adults were enrolled in the study, and they were divided into three different categories including: 18-27, 28-39, and 40-65 years old. The findings indicated that the first group (18-27 years), a fairly clear five-factor structure of time perspective was found as originally mentioned by Zimbardo in his model. While the oldest group (40-65 years), respondents, a three-factor structure emerged, which can be described as follows: Past-Negative combined with present-fatalistic, and past-positive combined with present hedonic and future.

However, differences in the factor structure of time perspective were interpreted in the context of developmental change. These findings are consistent with previous findings of Brothers et al. (2014) that examined the age association and age-group differences of FTP subfactors. Data were collected from 625 adults, ages 18 to 93 years old, representing three different developmental stages: young, middle-aged and elders. The results revealed a negative association between age and FTP. Young adults demonstrated greater uncertainty about the future than middle-aged or older adults. This study provided evidence for a pattern of age associations and age-group differences that are consistent with life-span developmental theory. Data on the development of FTP among different individuals, and groups according to age is still limited.

### *Purpose of the study*

The current study examined the development of AOT and its impact on FTP among college students in Saudi Arabia. This study had three objectives: (a) to investigate the relationship between AOT and Age and FTP and age. (b) to examine the difference in AOT and FTP according to Sex (male vs. female). (C) to study the impact of the interaction of AOT and Sex on FTP between Saudi college students.

### *Study Questions*

1. What is the development of AOT according to age?

2. What is development of FTP according to age?
3. What are differences in AOT and FTP according to sex?
4. What is the impact of the sex-specific AOT interaction on FTP?

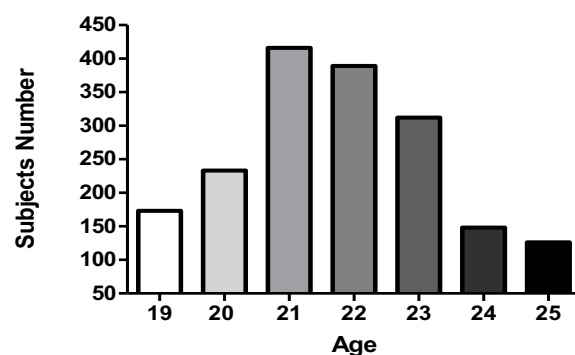
## Method

### *Participants*

Data were collected from 1,797 (697 females, 1,100 males) Saudi undergrad students across 10 different public universities in the Kingdom of Saudi Arabia. All participants completed both AOT and FTP scales. They reported no neurological or psychiatric problems, and their ages ranged between 19 and 25 years old (see Figure 1).

**Figure 1.**

*Histogram of the Distribution of the Participants Depending on the Age.*



### *Instruments & Measurements*

This study used two different instruments as follows:

#### *Actively Open-minded thinking (AOT) Scale*

A modified version of Stanovich and West scale (2007) was used in the current study that includes 30 items out of 41 items and was administrated to measure three

different dimensions of AOT (Flexible thinking, Definition of belief, and Dogmatic thinking). All items of the scale were rated on Likert-type response scale ranging from 1 (strongly disagree) to 5 (strongly agree). The AOT in the current study had poor overall internal reliability as measured by Cronbach's alpha ( $\alpha = .675$ ). To resolve this issue, the AOT score was recalculated and divided to three different factors based on the results of the exploratory factor analysis. The first factor measures dogmatic thinking that includes 13 items and has a good reliability ( $\alpha = .770$ ). The second factor measures the definition of belief that includes 7 items and revealed a good reliability ( $\alpha = .797$ ). The third factor focuses on reasoning that includes 10 items and shows a good reliability score ( $\alpha = .782$ ). There is a maximum score of 150 for the AOT scale, with a high score denoting open-minded individual and vice versa. This scale was translated with the use of back-translation into the Arabic language for use in Saudi Arabia.

### ***Zimbardo Future time Perspectives (FTP) Scale***

A modified short version of Zimbardo's Future time perspectives (Keough et al., 1999), was used in the current study, consisting of 3 main scales (negative, present, and future experiences) as a result of the exploratory factor analysis. Each scale includes 2 subscales that administered to measure positive and negative aspects of the past, and present hedonistic, present fatalistic and future perspectives. All items originally come from the Original ZFTP inventory (Zimbardo & Boyd, 1999) that includes 6 items focusing on past experience, 14 items for the present experience, and 10 items for future experiences. All items of the scale were rated on Likert-type response scale ranging from 1 (strongly disagree) to 5 (strongly agree). The FTP in the current study had low overall internal reliability as measured by Cronbach's alpha ( $\alpha = .602$ ).

To resolve this issue, the FTP score was recalculated and divided to three different factors based on the results of the exploratory factor analysis. The first factor measures past experience that includes 6 items and has good reliability ( $\alpha = .719$ ). The second factor measures present experience that includes 14 items and revealed good reliability ( $\alpha = .747$ ). The third factor focuses on future experience that includes 10 items and shows a high

reliability score ( $\alpha = .753$ ). This scale was translated with the use of back-translation into the Arabic language for use in Saudi Arabia.

## **Results**

### ***The development of AOT according to Age***

First, linear regression analysis was performed to investigate whether age significantly predicted AOT as measured by Flexibility thinking. The results were not statistically substantial, (but it is a trend), suggesting that age did not predict AOT as measured by flexibility thinking factor [ $F(1,1795) = 2.731, p = .09$ ].

Second, another linear regression was carried out to examine whether age significantly predicted AOT as measured by the belief concept. The results were not statistically significant, suggesting that age did not predict AOT as measured by the above-mentioned factor [ $F(1,1795) = 1.510, p = .219$ ].

A third linear regression was performed to predict the contribution of age on AOT as a measure by dogmatic thinking. The results were not statistically significant, demonstrating that age did not predict AOT as measured by the above-mentioned factor [ $F(1,1795) = 0.404, p = .525$ ]. These findings revealed that age could not predict any development on the concept of AOT.

Fourth, linear regression was carried out to predict the contribution of the age on AOT as measured by the total mark on AOT scale. The results were not statistically significant, indicating that age did not predict AOT as measured by the above-mentioned factor [ $F(1,1795) = 2.616, p = .106$ ].

### ***The development of FTP according to age***

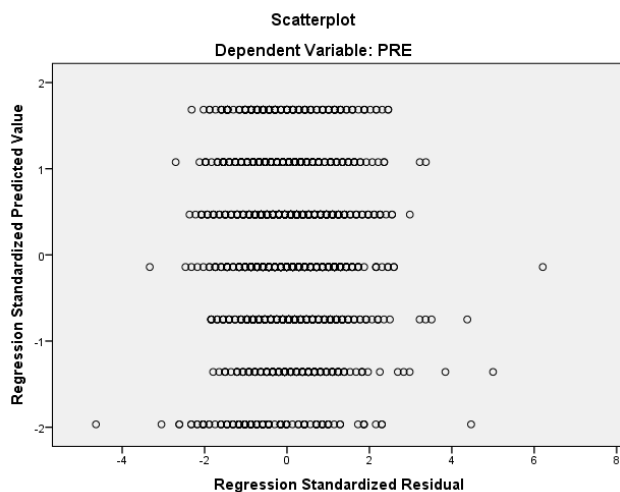
Linear regression analysis was performed to investigate whether age was significantly predictive of FTP as

measured by experience. The results were not statistically significant, suggesting that age did not predict FTP as measured by the above-mentioned factor [ $F(1,1795) = .637, p = .425$ ].

Then, another linear regression was examined to determine whether age significantly predicted FTP as measured by present experience. The results of this analysis showed that the model explained 7.6% of the variance, which revealed that the model is significant [ $F(1,1795) = 10.46, p < .001$ ]. Moreover, it was observed that age predicted FTP ( $R^2 = 0.006, \beta = 51.12$ ), (see Figure 2), according to FTP Subfactor: Present Experience, in that Present experience decrease with age increase.

**Figure 2.**

*Linear Regression Analysis of the Present Experience (FTP main factor).*



Moreover, a third linear regression was performed to test whether age was significantly predictive of FTP as measured by future perspectives. The results were not statistically significant, suggesting that age was not predictive of FTP as measured by above-mentioned factor [ $F(1,1795) = 0.234, p = .629$ ].

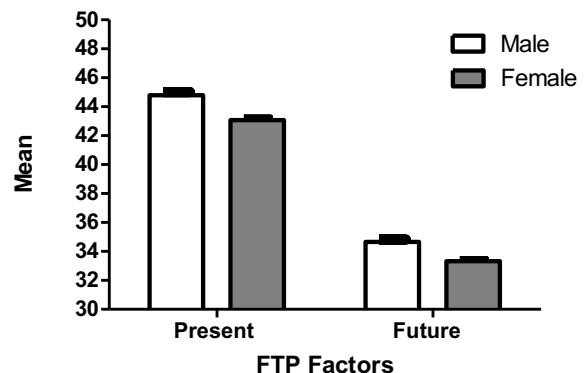
### *Differences in AOT and FTP according to Gender (male vs. female)*

An independent sample T-test was used to examine whether AOT and FTP and its subcomponents differ according to Gender (male vs. female). The results revealed substantial differences between male and female with respect to the concept of belief ( $t = 3.541, p = .001$ ), Flexibility thinking ( $t = 3.951, p = .001$ ), and the total score on AOT inventory ( $t = 4.183, p = .001$ ) for male vs. female participants, where male participants showed higher scores on AOT, and AOT subfactors (i.e., Flexibility & Belief concept) than the female participants.

Additionally, an independent sample t-test showed that there were differences between male and female on Present experience ( $t = 5.171, p = .001$ ), and Future ( $t = 4.908, p = .001$ ), and total FTP score ( $t = 4.452, p = .001$ ), with an average greater for male than female participants (see Figure. 3).

**Figure 3.**

*Mean and Standard Error of Present and Future.*



### *The interaction between AOT and sex on FTP*

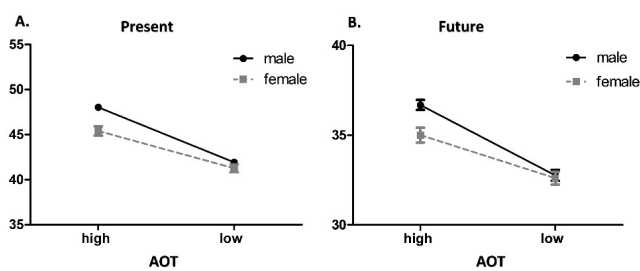
A two-way ANOVA was conducted to examine the interaction of AOT with Sex on different FTP subfactors.



The results revealed that both the present and future experience demonstrated an interaction effect between AOT and Sex. These findings reported a significant effect in relation to Present experience  $F(1,1156) = 5.408, p = .02$ , and Future experience  $F(1,1156) = 4.915, p = .027$  (see Figure 4). No other interaction has been reported.

**Figure 4.**

*Interaction of AOT and sex on FTP. A. for Present and B. For future.*



## Discussion

The present study examined the development of AOT according to age (19-25) among 1,797 Saudi college students, and its impact on the future time perspectives (FTP). Linear regression results of AOT as measured by the modified AOT scale (Stanovich & West, 2007), indicated that there is no change as a function of age. There is no evidence that AOT is affected by age, while there are no differences in AOT subfactors according to age. However, these findings in contrast to the finding of the Edgcumbe (2021), that suggested AOT changes as a function of aging. One crucial difference between the present study and the above-mentioned study is the age range which started from 18 to 87 years old, while the present study focused on the age from 19 to 25. Specifically, the present study investigated the development of AOT among college students. The demographic characteristics of the current study sample (college students) are the same, as the participants from Saudi Arabia have the same age range and they share the same homogeneous values and culture (Islamic Culture).

In addition, most college students in Saudi Arabia follow the same code and traditions, and it seems to influence their way of thinking. We are of course aware that culture has a significant impact on the perception of participants to utilize the principles and strategies of AOT in daily life.

Additionally, the current study investigated the development of FTP among college students. The results showed that the present experience decreases with age. These findings are consistent with the findings of Sobol-Kwapinska et al. (2019) that investigated the effect of FTP in different age groups, in the age range between (18-78 years). The results demonstrated there is different FTP structure according to the development of age between young versus older participants.

Moreover, the current study findings suggested that young college students (Freshman & Sophomore) think about the present experience after they joined the university level, which showed different aspects of experiences than high school. While junior and senior students gain this present experience by spending enough time to learn about the university and the university system. Therefore, they started to think about future issues. For this reason, present experience decreased with age. One more evidence for our interpretation is that linear regression does not show any significant value for other FTP subfactors (i.e., Past and Future).

These results indicate that the main focus of college students at KSA is on thinking about the present and the skills that may gain during the university level. Moreover, the results of the current study revealed main differences of AOT and AOT subfactors (i.e., Flexibility thinking and Belief concept) between male and female students, in which males have higher AOT and AOT scores than females.

These findings indicate that Saudi college male students are more open to changes than females. We believe that parenting styles and culture may explain these findings, as they place more constraints on females than males as well as influence the thinking patterns of female students. In contrast, males have the ability to go beyond cultural boundaries and interact with different cultures, which

contributes to increase their ability for openness in thinking and to gain some aspects of flexibility when they discussed the current and future issues related to their personal or academic experiences. These findings are in line with the findings of different studies that investigated the social type effects on AOT (Stanovich & West, 1998) that revealed a significant difference between males and females on AOT. These findings suggest that cultural boundaries may affect the acquisition of AOT among college students at KSA.

Furthermore, the results revealed major differences in FTP and FTP subfactors (i.e., present and future), between male and female, with males showing higher scores on FTP and FTP subfactors compared to female participants. These findings suggest that male students have a clear agenda about their current expectation, and present experience. In addition to, they have a preliminary plan for the future. However, it is not clear why female participants did not demonstrate this pattern. It seems that culture effect may influence the future and present perspectives among female participants. These findings were replicated when the interaction of AOT by sex was investigated regarding FTP and FTP subfactors.

The findings showed that there was no difference in FTP for those with low AOT scores, while the opposite pattern was reported in participants with high AOT scores, as they showed higher FTP and FTP subfactors for males than females. These findings suggested that AOT plays a significant role in the FTP and FTP subfactors.

### **Conclusion**

We concluded that AOT is considered an important predictor of FTP among Saudi college students, as those with high AOT scores showed a different pattern on FTP than those who score low on AOT. Moreover, the findings of the current study showed that the development of AOT requires different developmental stages that help individuals to acquire different skills and expertise and improve the cognitive process. However, the current study focused on one developmental stage (19 to 25), which does not show any changes in the concept of AOT and AOT subfactors. In contrast, the current study findings revealed that

there is developmental changes in the concept of FTP and FTP subfactors.

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### **References**

- Adams, J. & Nettle, D. (2009). Time Perspective, Personality and Smoking, Body Mass, and Physical Activity: An Empirical Study. *British Journal of health Psychology*, 14(1), 83–105. <https://doi.org/10.1348/135910708X299664>
- Baron, J. (1993). Why teaches thinking? - An Essay. *Applied Psychology: an international Review*, 42(3), 191–214. <https://doi.org/10.1111/j.1464-0597.1993.tb00731.x>
- Baron, J. (1995) Myside bias in Thinking about Abortion. *Thinking & Reasoning*, 1(3), 221–235. <https://doi.org/10.1080/13546789508256909>
- Baron, J. (2019). Actively Open-minded Thinking in Politics. *Cognition*, 188, 8–18.
- Baron, J. (2008). *Thinking and Deciding* (4<sup>th</sup>. ed.). Cambridge University Press.
- Brothers A., Chui, H., Diehl, M., & Pruchno, R. (2014). Measuring Future Time Perspective across Adulthood: Development and Evaluation of a Brief Multidimensional Questionnaire, *The Gerontologist*, 54(6), 1075–1088. <https://doi.org/10.1093/geront/gnu076>
- Cate, R. A. & John, O. P. (2007). Testing Models of the Structure and Development of Future Time Perspective: Maintaining a Focus on Opportunities in Middle Age. *Psychology and Aging*, 22(1), 186–201. <https://doi.org/10.1037/0882-7974.22.1.186>



- Cunningham K. F., Zhang J. W., Howell, R. T. (2015). Time Perspectives and Subjective Well-Being: A Dual-Pathway Framework. In M. Stolarski, N. Fioulaine, & V. van Beek (Eds.), *Time Perspective Theory: Review, Research and Application*. Springer. [https://doi.org/10.1007/978-3-319-07368-2\\_26](https://doi.org/10.1007/978-3-319-07368-2_26)
- Dalasio, N. (2020). *Decision-making, Beliefs, and Personality: Actively Open Minds Versus Cognitive Misers*. *Psychology Honors Papers*. [https://digitalcommons.ursinus.edu/psych\\_hon/6](https://digitalcommons.ursinus.edu/psych_hon/6)
- Dearing, J. A., Braimoh, A. K., Reenberg, A., Turner, B. L., & van der Leeuw, S. (2010). Complex land Systems: The Need for Long Time Perspectives to Assess their Future. *Ecology and Society* 15(4), Article 21. <https://doi.org/10.5751/ES-03645-150421>
- Edgcumbe, D. R. (2021). Age Differences in Open-Mindedness: From 18 to 87-Years of Age. *Experimental Aging Research*, 48(1), 24-41 <https://doi.org/10.1080/0361073X.2021.1923330>
- Haran, U., Ritov, I., & Mellers, B. A. (2013). The Role of Actively Open-Minded Thinking in Information Acquisition, Accuracy, and Calibration. *Judgment and Decision Making*, 8(3), 188–201. <https://doi.org/10.1017/S1930297500005921>
- Keough, K. A., Zimbardo, P. G. & Boyd, J. N. (1999) Who's Smoking, Drinking, and Using Drugs? Time Perspective as a Predictor of Substance Use. *Basic and Applied Social Psychology*, 21(2), Article 149164. <https://doi.org/10.1207/S15324834BA210207>
- Kooij, D. T. A. M., Kanfer, R., Betts, M., & Rudolph, C. W. (2018). Future Time Perspective: A Systematic Review and Meta-analysis. *Journal of Applied Psychology*, 103(8), 867–893. <https://doi.org/10.1037/apl0000306>
- Ladd, J. A. (2009). *The Influence of Actively Open - Minded Thinking, Incremental Theory of Intelligence, and Persuasive Messages on Mastery Goal Orientations* (Doctoral Thesis). Available from ProQuest Central; ProQuest Dissertations & Theses Global.
- Metz, S. E., Baelen, R. N., & Yu, A. (2020). Actively Open-minded Thinking in American Adolescents. *Review of Education*, 8(3), 768–799. <https://doi.org/10.1002/rev3.3232>
- Stolarski, M., Matthews, G., Postek, S., Zimbardo, P. G., & Bitner, J. (2014). How We Feel is a Matter of Time: Relationships Between Time Perspectives and Mood. *Journal of Happiness Studies*, 15, 809–827. <https://doi.org/10.1007/s10902-013-9450-y>
- Sobol-Kwapinska, M., Przepiorka, A., & Zimbardo, P. G. (2019). The Structure of Time Perspective: Age-related Differences in Poland. *Time & Society*, 28(1), 5–32. <https://doi.org/10.1177/0961463X16656851>
- Stanovich, K. E. & West, R. F. (1997). Reasoning Independently of Prior Belief and Individual Differences in Actively Open-Minded Thinking. *Journal of Educational Psychology*, 89(2), 342–357. <https://doi.org/10.1037/0022-0663.89.2.342>
- Stanovich, K. E. & West, R. F. (1998). Individual Differences in Rational Thought. *Journal of Experimental Psychology: General*, 127(2), 161–188. <https://doi.org/10.1037/0096-3445.127.2.161>
- Stanovich, K. E. & West, R. F. (2007) Natural Myside Bias is Independent of Cognitive Ability. *Thinking & Reasoning*, 13(3), 225–247. <https://doi.org/10.1080/13546780600780796>
- Svedholm-Häkkinen, A. M. & Lindeman, M. (2018) Actively Open-minded Thinking: Development of a Shortened Scale and Disentangling Attitudes Towards Knowledge and People. *Thinking & Reasoning*, 24(1), 21–40. <https://doi.org/10.1080/13546783.2017.1378723>

Toplak, M. E. & Stanovich, K. E. (2003). Associations between Myside Bias on an Informal Reasoning Task and amount of Post-secondary Education. *Applied Cognitive Psychology*, 17(7), 851–860. <https://doi.org/10.1002/acp.915>