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Happy as a Lark: Morning-Type Younger and Older Adults Are Higher in Positive Affect

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Abstract

A literature on young adults reports that morning-type individuals, or "larks," report higher levels of positive affect compared with evening-type individuals, or "owls" (Clark, Watson, & Leeka, 1989; Hasler et al., 2010). Morning types are relatively rare among young adults but frequent among older adults (May & Hasher, 1998; Mecacci et al., 1986), and here we report on the association between chronotype and affect in a large sample of healthy younger and older adults. Overall, older adults reported higher levels of positive affect than younger adults, with both younger and older morning types reporting higher levels of positive affect and subjective health than age mates who scored lower on morningness. Morningness partially mediated the association between age and positive affect, suggesting that greater morningness tendencies among older adults may contribute to their improved well-being relative to younger adults.

Keywords

chronotype; morningness-eveningness; positive affect; mood; aging

There are substantial age and individual differences in chronotype, or patterns of sleep/wake activity and energy levels that are tied to time of day and governed by internal circadian and sleep drives (Horne & Ostberg, 1977; May & Hasher, 1998; Mongrain, Carrier, & Dumont, 2006; Roenneberg et al., 2007). Morning types, or "larks," wake up early, plan activities early in the day and tend to retire early in the evening. In contrast, evening types, or "owls," awake later and are often active until late at night. Of course, many individuals fall between these two extremes (Horne & Ostberg, 1977). Research on young adults suggests that larks and owls differ in terms of well-being and susceptibility to psychiatric illness. For example, morningness is associated with a more stable personality (DeYoung, Hasher, Djikic, Criger, & Peterson, 2007) and greater subjective well-being (Randler, 2008). In contrast, eveningness is associated with increased susceptibility to depression (Drennan, Klauber, Kripke, & Goyette, 1991; Kitamura et al., 2010) and increased alcohol and stimulant use (Wittmann, Dinich, Merrow, & Roenneberg, 2006). Evening types are also more likely to report being in fair or poor general health (Paine, Gander, & Travier, 2006).

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Central to these differences in well-being and psychopathology may be variations in emotional state: Morningness among younger adults is associated with higher positive affect across the day (Clark et al., 1989; Hasler, Allen, Sbarra, Bootzin, & Bernert, 2010). Morning types also score higher on measures of energy-alertness and lower on tiredness compared with evening types (Froberg, 1977). In contrast, negative affect does not appear to vary with chronotype (Clark et al., 1989; Hasler et al., 2010). Thus, existing evidence suggests an association between chronotype and affect, with morning types reporting greater overall experience of emotions associated with positive activation, including excitement, cheerfulness, and alertness, compared with individuals with later time of day preferences.

This conclusion, however, is based solely on data from younger adults, and may be limited because the individuals in this age range show very different time of day preferences compared to individuals of other ages. While morning chronotypes are most common during childhood, there are more evening types in adolescence, reaching a peak at around age 19 in women and 21 in men (Kim, Dueker, Hasher, & Goldstein, 2002; Roenneberg et al., 2007). Thereafter, there are greater morningness tendencies in each subsequent age group, such that by age 60, a majority of individuals report feeling at their best in the morning (May & Hasher, 1998; Mecacci, Zani, Rocchetti, & Lucioli, 1986). These chronotype differences are thought to be linked to age-dependent changes in the concentration and timing of certain hormones, including cortisol and growth hormone, which influence the timing and quality of sleep (Roenneberg et al., 2007; Van Cauter, Leproult, & Plat, 2000). Although longitudinal evidence is lacking, retrospective self-assessments of chronotype for various stages in development support the pattern of cross-sectional differences (Roenneberg et al., 2007). Thus, older adults (ages 60 – 80) markedly differ from younger adults in terms of chronotype; their sleep–wake times are shifted earlier as is their preferred time for activities.

Given substantial age-related differences in chronotype patterns, it is unknown whether the relationship between morningness and emotional state observed in younger adults also holds for older adults. There is evidence that positive affect and subjective well-being are higher in older adulthood (Carstensen et al., 2011; Mroczek & Kolarz, 1998; Stone, Schwartz, Broderick, & Deaton, 2010). Considering the association between morningness and age, this raises an intriguing possibility: Reports of age differences in positive affect may be tied to the greater proportion of morning-type individuals age 60 and above. In addition, given previous evidence that evening-type individuals are more likely to report being in poorer health (Paine et al., 2006), it is also possible that chronotype may contribute to individual differences in older adults' subjective health ratings. Subjective health is an important component of well-being and is known to be a strong predictor of objective health outcomes and mortality in older people (Idler & Benyamini, 1997).

To address the question of whether the association between morningness and well-being exists in older adults, we obtained measures of chronotype, affect and subjective health in both younger (ages 17–38) and older adults (ages 59 –79). Because older adults report both improved positive affect and a stronger tendency toward morningness, we also tested whether age differences in chronotype partially explain age-related differences in well-being.

Method

Participants

Four hundred thirty-five younger adults (ages 17–38 years, $M = 19.7$, $SD = 2.7$) and 297 older adults (ages 59 –79 years, $M = 67.8$, $SD = 4.9$) participated in this study. Younger adults (153 men, 282 women) were undergraduate students at the University of Toronto who participated for course credit or monetary compensation. Older adults (125 men, 172 women) were healthy, community-dwelling volunteers who received monetary compensation. The majority of older adults were retired. As is common in social and cognitive studies of aging, older adults had more years of education ($M = 16.6$, $SD = 3.7$) compared with younger adults ($M = 13.6$, $SD = 1.9$), $t(398) = 12.79$, $p < .001$, who were still enrolled in university.

Measures

Participants filled out pencil-and-paper questionnaires individually in a laboratory setting during the typical working day (9:00 a.m. to 6:00 p.m.) as part of several studies on cognition and aging.

Chronotype was determined using the Morningness-Eveningness Questionnaire (MEQ; Horne & Ostberg, 1976), a reliable and well-validated measure of chronotype. The MEQ includes 19 questions gauging an individual's preferred rising and sleep times, and optimal time for physically or intellectually demanding activities based on his or her own "feeling best rhythm" (e.g., "Considering your own "feeling best" rhythm, at what time would you get up if you were free to plan your day?", "How alert do you feel during the first half hour after having woken in the morning?", "At what time in the evening do you feel tired, and, as a result, in need of sleep?"; Horne & Ostberg, 1976). Questions are given scaled scores and summed to determine each individual's morningness-eveningness rating. Scores range from 16 to 86, and can be categorized as *definitely evening* (16 –30), *moderately evening* (31–41), *neutral* (42–58), *moderately morning* (59 – 69), and *definitely morning* (70 – 86) chronotypes (Horne & Ostberg, 1976). Test–retest reliability for the MEQ is high (Kerkhof, 1984), and MEQ scores predict measures of circadian timing and sleep drive, including oral temperature, sleep/rising times, and patterns of alertness (Horne & Ostberg, 1977; Zavada, Gordijn, Beersma, Daan, & Roenneberg, 2005). The MEQ has been widely used with both younger and older adults and predicts variations in cognitive performance across the day in both age groups (e.g., May & Hasher, 1998).

Individual differences in affective state were measured using the Brief Mood Introspection scale (Mayer & Gaschke, 1988), which requires participants to rate the extent to which they currently feel each of 16 mood adjectives on a 7-point response scale. Scores were calculated on a positive-tired dimension (ranging from *active* and *peppy* to *tired* and *drowsy*) and a negative-relaxed dimension (ranging from *jittery* and *nervous* to *calm*), corresponding respectively to the positive and negative affect dimensions of emotion as theorized by Watson, Wiese, Vaidya, and Tellegen (1999). Both scales have good factor validity and reliability (Mayer & Gaschke, 1988). In our sample, internal consistency was acceptable for each scale in younger and older adults (Cronbach's alphas > .74).

Participants were also asked to judge their overall health on a scale from 1 (*poor*) to 10 (*excellent*). This measure is similar to other single-item subjective health indicators that have previously been shown to predict morbidity and mortality (Idler & Benyamini, 1997).

Results

The distribution of chronotypes for younger and older adults is shown in Table 1. Older adults mean MEQ score was 59.4 (SD = 10.4), a value in the moderately morning range. Younger adults mean MEQ score was 43.8 (SD = 10.0), a value close to the evening side of the neutral category. Consistent with past research (May & Hasher, 1998; Mecacci et al., 1986), older adults showed a reliably greater tendency toward morningness, $t(730) = 20.37$, $p < .001$, $d = 1.53$.

Older adults reported better moods, with higher positive affect (M = 20.8, SD = 7.1) compared with younger adults (M = 10.8, SD = 6.4), $t(730) = 19.92$, $p < .001$, $d = 1.48$, and lower negative affect (M = 4.0, SD = 5.9) than their younger counterparts (M = 8.4, SD = 5.9), $t(730) = 9.92$, $p < .001$, $d = 0.75$. Older adults also rated their subjective health more highly (M = 8.0, SD = 1.5) compared with younger adults (M = 7.7, SD = 1.3), $t(552) = 2.69$, $p = .01$, $d = 0.21$.

Participants had choice about their appointment times, and there was a moderate association between MEQ score and time of measurement for younger adults ($r = -.18$, $p < .001$) and for older adults ($r = -.13$, $p = .02$). Thus, we included time of measurement as a covariate in all analyses. The partial correlations for MEQ scores, affective ratings, subjective health, and age within younger and older adults are shown in Table 2. As can be seen, a greater tendency toward morningness was associated with higher positive affect for both younger and older adults. Negative affect was not associated with morningness in either age group. Morningness was also associated with improved subjective health ratings in both groups. Among younger adults, age was associated with higher positive affect, but not chronotype, negative affect or subjective health. In the older adult group, age was not associated with chronotype, affect or health.

To test the hypothesis that age-related differences in chronotype contribute to well-being, we constructed a mediation model across all participants in which age in years predicted positive affect with morningness as a mediator. Following Baron and Kenny's (1986) criteria for mediation, age predicted positive affect ($\beta = 0.207$, $p < .001$), and age also predicted the mediator, morningness ($\beta = 0.322$, $p < .001$). Critically, morningness predicted positive affect when age was controlled ($\beta = 0.149$, $p < .001$). This mediation was partial, because the association between age and positive affect remained when morningness was added as a mediator ($\beta = 0.159$, $p < .001$). We also conducted formal significance testing of the indirect effect using the Sobel test of mediation and a bootstrap approach, as recommended by Preacher and Hayes (2004). Both procedures indicated that morningness partially mediated the relationship between age and positive affect ($\beta = 0.048$, $p < .001$, 95% confidence interval [CI] = [0.033, 0.065]).

Discussion

Our results demonstrate that morningness is associated with higher positive affect among both younger and older adults, as has previously been shown in younger adults only (Clark et al., 1989; Froberg, 1977; Hasler et al., 2010). Negative affect was not associated with individual differences in chronotype in either age group (see also Clark et al., 1989; Hasler et al., 2010). These two findings are consistent with the theoretical position that positive, but not negative affect should be closely tied to an individual's internal biological clock (Watson et al., 1999), as positive affect is known to fluctuate according to a 24-hr cycle (Murray et al., 2009). Our study adds to evidence of a relationship between positive affect and chronotype by demonstrating that morningness is associated with greater positive but not negative affect in a similar manner in both younger and older adults. We note that this particular association with chronotype may not hold for all behaviors related to positive affect (e.g., see Soehner, Kennedy, & Monk, 2007).

Morningness was also associated with better subjective health, a relationship that is consistent with research suggesting that evening types are more likely to rate their health as fair or poor relative to morning types (Paine et al., 2006). This finding is particularly important in regards to older adults, because subjective health ratings in older age are a strong predictor of objective health outcomes and mortality (Idler & Benyamini, 1997). Morningness may be a protective factor associated with improved health in later life. Of course, it is also possible that declining health could lead to a movement away from morningness.

We also found an effect of age group on subjective health: Older adults gave higher subjective health ratings than younger adults. While at first glance this may seem surprising, previous work suggests that older adults sometimes show a positivity effect when rating their health, particularly when an age-comparative reference point is used (Suls, Marco, & Tobin, 1991). It is possible that younger and older adults tested here used different reference points when evaluating their health.

Our results show that older adults report higher levels of positive affect and lower levels of negative affect compared to younger adults, replicating previous evidence of differences in emotional state across the life span (Carstensen et al., 2011; Mroczek & Kolarz, 1998; Stone et al., 2010). The data reported here demonstrate that morningness at least partially accounts for age differences in positive affect, suggesting that circadian rhythm or sleep timing mechanisms may contribute to greater positive affect in the senior years. These processes may or may not be separate from other theorized mechanisms, such as age-related improvements in emotion regulation (Carstensen, Isaacowitz, & Charles, 1999; Urry & Gross, 2010). It is possible that morningness interacts with improved emotion regulation to boost older adults' positive affect: For example, if morning-type older adults more effectively regulate emotions in the morning, they may be in a more positive state for the rest of the day (i.e., by "starting the day off right"). Improved emotion regulation in the morning might be predicted from findings that cognitive control processes (such as those used to enhance positive information; Mather & Carstensen, 2005) function optimally in the morning among morning-type older adults (May & Hasher, 1998).

Our findings suggest that there are positive emotional consequences tied to morningness tendencies that are common among older adults. However, a number of limitations to this study should be noted. First, all measures were self-report; use of more specific circadian or sleep timing data would be helpful. Also, participants rated their current affective state only; future research using a trait measure that asks how participants usually feel would provide a more stable measure of individual differences in affect. An additional limitation is the use of a cross-sectional design. Some authors (e.g., Lindenberger, von Oertzen, Ghisletta, & Hertzog, 2011) have identified concerns about the use of meditational analyses to examine age-related variance in cross-sectional designs. Future longitudinal work that includes middle aged adults is needed to establish whether there are age-related changes in chronotype and affect that occur in parallel. Both retired older adults and, to a lesser extent, undergraduate students, are relatively free to determine morning rising times, and it is unclear how this may have influenced the pattern of results. The inclusion of adults who are working full time, and therefore less able to wake at their preferred time, would help determine how employment status may influence this association.

Why might morningness be beneficial to positive affect and health? One possibility is that morning-type individuals benefit from the close correspondence between societal expectations and their preferred times for activity. In contrast, normal school and work schedules that begin early in the day force evening-type individuals to wake earlier than their preferred time, a phenomenon dubbed “social jetlag” that can result in sleep loss and emotional distress (Wittmann et al., 2006). It is possible that older adults are less vulnerable to these social jetlag effects because they are more likely to be morning types and therefore have a preferred time of day in line with societal expectations. They may also be less affected by these expectations if they are retired (Wittmann et al., 2006). Some evidence also suggests that biological mechanisms related to circadian and homeostatic sleep drives may contribute to the association between chronotype and affect. For example, morning light exposure, which results in a phase advance of the sleep/wake cycle, improves depressive symptoms in seasonal affective disorder (Lewy et al., 1998). In addition, shifting sleep earlier by 6 hr successfully alleviates nonseasonal depression in some cases (Wirz-Justice & Van den Hoofdakker, 1999). These improvements suggest that early sleep/wake times may have positive emotional effects. It is possible that shifts toward morningness can improve one’s levels of positive affect and subjective health, and do so in a similar manner across the life span. Waking up early may indeed make one happy as a lark.

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Table 1

Distribution of Morningness-Eveningness Questionnaire (MEQ) Types and Means for Each Category for Younger and Older Adults

	Younger adults (*n* = 435)		Older adults (*n* = 297)	
Type	**%**	***M***	**%**	***M***
Definitely evening	9.2	26.9	1.0	27.7
Moderately evening	33.8	36.8	5.7	37.9
Neutral	49.7	48.7	36.0	52.4
Moderately morning	6.4	61.9	38.0	63.1
Definitely morning	0.9	74.5	19.2	73.1

Table 2

Spearman Rank Order Correlation Coefficients for Chronotype, Well-Being, and Age

Measure	1	2	3	4	5
Younger adults					
1. MEQ	—				
2. Positive affect	.25**	—			
3. Negative affect	−.04	−.21**	—		
4. Subjective health	.12*	.19**	−.19**	—	
5. Age	.02	.13*	−.04	.09	—
Older adults					
1. MEQ	—				
2. Positive affect	.19**	—			
3. Negative affect	−.08	−.34**	—-		
4. Subjective health	.18*	.33**	−.22**	—	
5. Age	.02	−.04	−.09	.03	—

Note. MEQ = Morningness-Eveningness Questionnaire. The effect of time of measurement is factored out as a covariate.

* $p < .01$.

** $p < .001$.