



# Daily Identity Processes and Emotions in Young Adulthood: a Five-Day Daily-Diary Method

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## Abstract

The process of exploring and committing to one's identity for the sake of a future-oriented goal is important for young adults' psychosocial functioning. Whereas the relationship between identity process and psychosocial functioning has been examined in long-term longitudinal studies, the short-term relationship between the two at the daily level has not been clarified. This study developed a measure of daily-level identity process and examined their relationship with daily positive and negative emotions, using a five-day daily-diary method. The participants included 721 Japanese young adults aged 18–30 years (54.4% female,  $M_{age} = 26.05$  years). Results indicated the measure's three-factor structure, including commitment, active exploration, and ruminative exploration. Commitment related positively to life satisfaction and happiness, and negatively related to depression. Active exploration and ruminative exploration indicated negative associations with life satisfaction and happiness, and positive association depression. Latent profile analysis extracted five theoretically meaningful identity profiles at the daily level: *foreclosure*, *moratorium*, *troubled diffusion*, *searching moratorium*, and *carefree diffusion*. Logistic regression analyses indicated that *troubled diffusion* and *moratorium*, and *foreclosure* profiles showed lower and higher levels of life satisfaction and happiness, respectively. These results provided evidence of a strong link between young adult's identity processes, profiles, and positive and negative emotions at the everyday level. Implications and suggestions for future research are discussed.

**Keywords** Daily-diary reports · Identity process · Young adulthood · Daily emotions · Future goal

## Introduction

Young adulthood is a critical period in identity development. Identity represents a coherent and consistent sense of self over time and across situations (Erikson, 1968). To accomplish a clear sense of identity, young adults explore

future plans and goals that are perceived to be important for their identity in ideology, job, and romantic relationships (Luyckx et al. 2014). Young adults who have a clear sense of commitment toward future goals and lifestyles feel positive about themselves and are less likely to be distressed (Luyckx et al., 2013). On the other hand, young adults who have unclear future-oriented goals and ruminate about their future experience a strong feeling of depression (Becht et al., 2019). Whereas numerous studies have provided evidence for the relationship between identity processes and psychosocial functioning, these studies relied on cross-sectional or long-term longitudinal research designs (i.e., the time interval was three months to one year). Individuals experience a sense of identity processes in their daily lives as well, and these sense are strongly related to daily motions (Bosma & Kunnen, 2001). However, little is known about how these identity processes and emotions actually related to each other at the daily level. To address the research gap, this study examined the relationship between identity process and positive and negative emotions at daily level in young adulthood.

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## Identity Process and Psychosocial Functioning

In the transition from adolescence to adulthood, individuals need to become psychologically independent from their parents and seek their own future way of life (Côté & Levine, 2016). They develop their own norms, values, and commitments based on the values and ethics taught by their parents (i.e., identification; Erikson, 1968). This is the process in which individuals create a framework to guide their own daily activities involving consistent ways of thinking and acting (Klimstra et al., 2010). Individuals who can successfully guide this process feel a sense of stability and continuity, while others who fail in it experience a fragmented, changeable, and haphazard sense of self (identity confusion; Erikson, 1968). This identity formation process involves exploration and enactment of commitment in identity-related domains (Marcia, 1966). Exploration is the individual's active search for future values, goals, and beliefs, and commitment refers to the selection and the engagement in relevant activities toward the implementation of these choices.

To allow for a more fine-grained description of exploration and commitment, a five-dimensional identity process model was developed (Luyckx et al., 2008). This model focuses on the identity process oriented toward the future. Furthermore, the five-dimensional model consists of a dual cycle: commitment formation cycle and commitment evaluation cycle. In the commitment formation cycle, exploration in breadth represents actively seeking one's future-oriented goals, where commitment making represents choosing and deciding on a future-oriented goal. This formation cycle represents a cycle in which individuals search for and find their future goals. Even after individuals find a future goal to which they are committed, they still may reflect it. The five-dimensional model assumes a second cycle involving an evaluation of this commitment. With respect to the commitment evaluation cycle, exploration in depth represents actively thinking about one's commitment by gathering information and discussing it with others; identification with commitment denotes gaining confidence from chosen future-oriented goals. In both cycles, individuals do not always progress towards identity synthesis. At times, they may worry and get stuck in thinking about their future-oriented goals in a maladaptive ruminative fashion, and this ruminative exploration inhibits the progressive formation and evaluation of commitments.

While setting clear goals for the future and achieving a sense of security is accompanied by a sense of psychological stability and happiness, the exploration of future goals may also involve a sense of anxiety (Schwartz et al., 2011). Commitment making and identification with commitment were positively associated with life satisfaction and happiness and negatively related to negative affect (Hatano &

Sugimura, 2017; Luyckx et al., 2013). Exploration in breadth and depth showed that some results were positively associated with depression (Luyckx et al., 2008) and others were not (Luyckx et al., 2013). Ruminative exploration, in particular, was strongly associated with depression (Becht et al., 2019).

## Identity Profile and Psychosocial Functioning

An individual's identity formation can be represented by a combination of identity processes. Individual differences in how individuals tackle identity-related issues is referred to as identity status or profile (Marcia, 1980). To date, across studies, seven identity profiles or identity statuses have been identified as a combination of five dimensions (see Luyckx et al., 2013; Schwartz et al., 2011). Individuals in an identity *achievement* profile are characterized by high commitment and proactive exploration, and by low ruminative exploration. They feel a strong commitment to the future goals, and simultaneously, seek to expand their possibilities without anxiety. Individuals in the *foreclosure* profile have a moderate to strong sense of commitment, and low proactive and maladaptive explorations. These individuals are satisfied with their current situation and do not actively explore future goals.

The *moratorium* profile represents individuals who are low to moderate in commitment, and high in active and maladaptive explorations. The *searching moratorium* profile includes individuals scoring high on all of the dimensions. With respect to these two moratorium profiles, individuals in the *moratorium* profile explore possibilities due to a lack of security in their future plans, while individuals in *searching moratorium* profile explore further possibilities with the conflicting emotions of anxiety and security in their future goals.

The *troubled diffusion* profile individuals are characterized by low commitment and proactive exploration, and by high ruminative exploration. Individuals in a *carefree diffusion* profile score moderate to low in all the identity processes. With respect to the differences between these two diffusion profiles, a *troubled diffusion* profile engages in a problematic approach to identity challenges (i.e., ruminative exploration), while a *carefree diffusion* profile does not engage in their future goals. Finally, the *undifferentiated* profile individuals are characterized by moderate scores on all the identity processes. Individuals with undifferentiated profile work on future goals in a modest and unremarkable way.

The profiles with high commitment scores (i.e., *achievement* and *foreclosure*) are associated with higher life satisfaction and lower anxiety than those with low commitment scores (i.e., *moratorium* and *troubled diffusion*); the *searching moratorium*, *carefree diffusion*, and *undifferentiated*

profiles show relatively moderate levels of life satisfaction and anxiety when compared to the high commitment and low commitment profiles (Luyckx et al., 2013; Schwartz et al., 2011). These findings suggest that high levels of commitment and low levels of ruminative exploration play an important role in psychosocial functioning.

### Short-Term Identity Formation at the Daily Level

While several studies focus on the identity formation from a long-term development perspective, these long-term longitudinal studies ignore identity changes at shorter time intervals (Klimstra et al., 2010). In addition, these studies overlook the specific moments when young adults engage in their future plans and goals. For example, “Future plans give me self-confidence” is an item of identification with commitment (Luyckx et al., 2008), and this item does not consider when the young adults felt the sense of identification with commitment. Identity formation is a cognitive and emotional process by which individuals integrate their identity-related experiences of contexts and situations in everyday life into their sense of coherence (De Ruiter et al., 2021). Specifically, future goals that individuals reflect upon in their daily lives are integrated into an overall future goal orientation. This means that one’s long-term sense of identity is anchored in one’s short-term and everyday sense of identity (Klimstra and Schwab 2021). Identifying the links with an overall sense of identity process and identity process at a daily level has helped outline the mechanisms of identity formation and link it with psychosocial functioning (Lichtwarck-Aschoff et al., 2008).

Previous studies on identity formation in the short-term at a daily level have focused on educational and interpersonal identity processes (for a review, see Klimstra and Schwab 2021). In these studies, a single item measuring the identity processes in “education” and “friendship” domains was developed, and data were collected using the “diary” method. Specifically, these studies were designed to ask about specific experiences by including the word “today” in the items (e.g., “Today, I felt confident about myself because of my education/best friend”; Klimstra et al., 2010). One study demonstrated that the adolescents who had a strong commitment at the daily level were less likely to feel anger, depression, and sadness, whereas those engaged in exploration in depth and the reconsideration of commitment tended to experience more negative emotions (Klimstra et al., 2016). Another study showed that individuals with a low commitment profile had a greater risk of experiencing school and global anxiety and aggression and were less likely to receive support from their friends (Becht et al., 2016b). These findings suggest that individuals with higher daily identity commitment experience lower levels of

negative emotions over time, and vice versa, in the educational and interpersonal domains.

However, there is no research that examines the relationships between the identity processes oriented toward the future and positive and negative emotions at the daily level. Therefore, it is not clear whether these associations between long-term identity processes and psychosocial functioning can be found at the daily level. To advance the research on identity processes, this study focuses on identity processes and profiles in the “future” domain and examines their relationship with positive and negative emotions at the daily level.

### Japanese Social Contexts in Young Adulthood

Identity formation is strongly influenced by social context (Galliher et al., 2017); specifically, one’s future-oriented goals depend on the socioeconomic conditions of the country. In Japan, where the present study was conducted, Growth Domestic Product (GDP) growth has been hovering around 0 to 1.0% between 2015 and 2019, with a significant decline in 2020 (Cabinet Office, 2021). When GDP was not as high, the employment rate for university students was around 95% from 2015 to 2020 (Ministry of Health, Labor and Welfare, 2020). This does not indicate an adverse employment situation among the young adults. However, numerous young adults in Japan are worried about their financial condition, work career establishment, and their future (Cabinet Office, 2018). They particularly feel conflicted between the job they want and a job that would provide financial stability. Previously, very few young adults in Japan changed jobs due to Japan’s “lump-sum hiring of new graduates.” This is a unique Japanese-style employment system in which companies recruit batches of students who would soon graduate (new graduates) from school or university every year. The employers conduct examinations to screen students who are still in school or university, offer jobs to them, and have them join work immediately after graduation. It was common for employees to work until retirement, even if they felt they were not suited to the company (Brinton, 2011). In recent years, an increasing number of companies have been hiring mid-career workers, and the number of young people changing jobs has also been increasing (Ministry of Public Management, Home Affairs, Posts and Telecommunications, 2019). In addition, only 17.3% of young people believe that they should not change jobs even if possible, while 62.1% believe that they should change jobs under certain circumstances (Cabinet Office, 2019). These results indicate that, in Japan, young adulthood may be a time when they begin to establish their career.

The attitudes toward marriage are also changing. The average age of people getting married for the first time in

Japan was 26.0 years for men and 24.5 years for women in 1985. However, it was 31.1 years for men and 29.4 years for women in 2018 (Ministry of Health, Labor and Welfare, 2019). The results of this survey suggest that both men and women might be attempting to establish their careers during young adulthood. Furthermore, the number of young people, both men and women, who do not want to get married or have children, is increasing. In a 2008 survey, 11.9% of men and 7.9% of women reported that adults did not want to marry; in 2015, that percentage was 21.6% for men and 12.9% for women (National Institution for Youth Education, 2015). This survey suggests that some of the men and women may be changing their attitudes toward marriage, particularly the idea of necessarily getting married.

These surveys suggest that young adults in Japan may be a mixture of individuals with traditional conservative views of establishing a career (leaving one's future in the hands of one company) and views on marriage (getting married), and individuals with career establishment goals that prioritize individual rights (changing jobs to suit one's own aptitude) and modern views on marriage (not necessarily requiring marriage) (Sugimura, 2020). These diverse views regarding career and marriage affect the future goals of young adults. Owing to this dilemma, Japanese young adults tend to develop a sense of confused identity rather than a clear sense of identity after 18 years of age. This trend approximately continues until the age of 25 years (Hatano et al., 2022). Hence, young adulthood in Japan is a challenging period for identity formation when individuals are more likely to feel conflicted about future-oriented goals.

## Current Study

Although identity processes in the future domain is crucial for capturing the development of young adults, no studies have focused on the processes at the daily level, and their relationship to psychosocial functioning remains unclear. This study aims to fill these gaps by examining the relationships between identity processes, identity profiles, and positive and negative emotions at the daily level in young adulthood. To do so, items were developed to measure identity dimensions in the future domain at the daily level. The current study aims to fulfil the following two research objectives. First, this study seeks to extend previous research by empirically testing whether identity processes and emotions are related at the daily level (Objective 1). Commitment making and identification with commitment were expected to be positively related to positive emotions and negatively related to negative emotions. Exploration in breadth and depth were expected to have a weak or non-significant positive association with negative emotions.

Ruminative exploration was expected to be negatively related to positive emotions and positively related to negative emotions.

Second, this study aims to investigate whether identity profiles and individual differences in positive and negative emotions are related at the daily level (Objective 2). Regarding identity profiles, up to seven identity profiles were expected to be identified based on long-term studies (i.e., *achievement*, *foreclosure*, *moratorium*, *searching moratorium*, *troubled diffusion*, *carefree diffusion*, and *undifferentiated*; Luyckx et al., 2013; Schwartz et al., 2011). Concerning the link between identity profiles and emotions, it was expected that young adults with high commitment and low ruminative exploration profiles (i.e., *achievement* or *foreclosure* profiles) would be more positive emotions and less negative ones, while those with low commitment and high ruminative exploration profiles (i.e., *moratorium* or *troubled diffusion* profiles) would demonstrate the opposite trend. Young adults with moderate commitment and ruminative exploration profiles (*searching moratorium*, *carefree diffusion*, and *undifferentiated* profiles) would report a level of positive and negative emotions that lies in between what is expected for high versus low commitment profiles.

## Methods

### Participants

Overall, 721 young adults, who participated for a minimum of three days in the five-day survey period, were included in the analyses (54.4% female,  $M_{\text{age}} = 26.05$ ,  $SD = 3.53$ ). Overall, 284 respondents participated on the first day (60.6% were missing), 402 on the second day (44.2% were missing), 659 on the third day (8.6% were missing), 648 on the fourth day (10.1% were missing), and 640 on the fifth day (11.2% were missing). On an average, 26.8% respondents were reported missing per day. The number of participants varied from day to day; however, all those who completed the survey any given day answered all the items. Therefore, there were no missing values in the data for each day that the respondents were present.

Among them, 38.8%, 19.2%, and 13.9% lived in the Kanto, Kansai, and Chubu regions (highly urban) of Japan, respectively, and the others lived in less urbanized regions. 16.9% were university students (50.0% female,  $M_{\text{age}} = 20.68$ ,  $SD = 2.17$ ), 39.8% were office workers (46.0% female,  $M_{\text{age}} = 27.42$ ,  $SD = 2.36$ ), 9.0% were homemakers (100% female,  $M_{\text{age}} = 27.95$ ,  $SD = 1.84$ ), and 18.3% were civil servants (63.6% female,  $M_{\text{age}} = 26.64$ ,  $SD = 2.94$ ), with 15.9% belonging to other categories (e.g., unemployed; 43.5% female,  $M_{\text{age}} = 26.56$ ,  $SD = 3.09$ ).



A total of 150 young adults (20.8% of the survey participants) responded to all of the surveys. A *t*-test was conducted to examine the presence of an age difference between participants who responded to all the complete survey versus participants who did not. However, no significant differences in age were identified [ $t(719) = 1.608, p = 0.108, d = 0.15$ ]. Furthermore, chi-square tests were conducted to examine whether there was a difference in the percentage of sex, occupation, and residential areas between those who responded to all the surveys and those who did not. The distribution did not differ significantly according to sex [ $\chi^2(1, N = 721) = 0.203, p = 0.652, \text{Cramer's } V = 0.017, p = 0.652$ ], social position [ $\chi^2(4, N = 721) = 4.815, p = 0.307, \text{Cramer's } V = 0.082, p = 0.307$ ] and residential area [ $\chi^2(1, N = 721) = 3.795, p = 0.051, \text{Cramer's } V = 0.073, p = 0.051$ ]. To examine the missing data pattern, Little's (1988). Missing Completely at Random test was performed. The result was  $\chi^2(500) = 498.051, p = 0.516$ , indicating that the missing data pattern was likely to be at random. The full information maximum likelihood estimation was employed for the missing values. To observe deviations from the normal distribution for the study variables, the maximum likelihood robust estimation method was applied using Mplus 8.6 (Muthén and Muthén 1998–2021).

## Procedure

Data were collected by an online survey company, Cross Marketing, Inc. (<https://www.cross-m.co.jp/en/>). People of various ages, professions, and regions are registered with this company, and their data can be gathered on request. The company regularly conducts quality control checks, including periodically checking for irregularities in registration, and only those who pass these checks are registered. In this study, the authors collected the data of registrants aged between 18 and 30 years. In addition, they requested that the distribution of respondents based on sex be equal. In March 2019, there were 144,264 registrants (67.8% female) who were contacted with the request. Finally, 721 Japanese young adults were included in this study. The authors sent the survey items to the company, the company created a survey form based on the items, and the authors verified the created form.

A web address for the survey was emailed to the registrants who had provided informed consent and agreed to participate in the study. The survey was conducted over a five-day period in a single week, with participants responding to the survey every day during the week of March 13, 2019 to March 20, 2019.

The participants were instructed to complete the survey using their smartphones between 6 pm and 12 am. They were paid an honorarium of approximately 50 yen (0.5 USD) per survey; 300 JPY (3 USD) was awarded to those who answered all the survey questions in the allotted time period.

## Measures

### Daily identity process

A single item was developed to measure each identity processes. First, five items, one for each dimension, were created in Japanese that corresponded to those of the Dimensions of Identity Development Scale (DIDS; Luyckx et al., 2008) and the single-item version of the Utrecht-Management Identity Commitment Scale (U-MICS; Klimstra et al., 2010). The items were created based on the following criteria: (1) the word “today” was to be added to the beginning of each item and (2) the wordings should be easy for Japanese young adults to understand. The following five items in English were translated by a Japanese-English bilingual individual: “Today, I had a clear view on my future” (commitment making), “Today, I felt confident about my future plans” (identification with commitment), “Today, I considered other possible lifestyles that may suit me better” (exploration in breadth), “Today, I worked out for myself if my life’s purpose really suits me” (exploration in depth), and “Today, I worried about my future plans” (ruminative exploration). These items were rated on a five-point Likert scale ranging from one (*completely untrue*) to five (*completely true*).

### Daily emotions

A single measure was developed to examine the participants’ positive and negative emotions. For their positive emotions, items measuring life satisfaction and happiness were developed with reference to the Satisfaction with Life Scale (Diener et al., 1985) and the Subjective Happiness Scale (Lyubomirsky & Lepper, 1999). To assess their negative emotions, items measuring depressive moods were created with reference to the Daily Mood Scale (Hoeksma et al., 2000). The items were created based on the following criteria: (1) the word “today” was to be added to the beginning of each item, and (2) the wording should be easy for Japanese young adults to understand. These items were initially written in Japanese and were subsequently translated to English, with them being examined by a Japanese bilingual person who also spoke English. The items developed through this process included “Today, I am feeling satisfied” (life satisfaction), “Today, I am feeling happy” (happiness), and “Today, I am feeling down” (depression). The instruction for each item was as follows: “To what extent did you experience the following thoughts today?” These items were then rated by the participants on a five-point Likert scale from one (*completely untrue*) to five (*completely true*). For all analyses, a mean score across days for daily emotions was computed.

## Statistical Analysis

As a preliminary analysis, factor structure was examined by confirmatory factor analysis (CFA). For the factor structure, the analysis was adapted from the study that examined the factor structure of a single-item version of the scale using data from a diary method (Becht et al., 2016a). A latent variable as a single item with a daily mean value was assumed (Fig. S1); that is, for each identity factor, the five daily single items were used as indicators of the respective factor. In addition, a measurement invariance test was conducted for sex. Three different levels were examined: configural (same number of factors and pattern of factor loadings across sex), metric (constraining the indicator factor loading to be equal across sex), and scalar (constraining the indicator factor loading and item intercepts to be equal across sex). For optimal model fit, the comparative fit index (CFI) should exceed 0.95, with values higher than 0.90 considered acceptable, and the root mean square error of approximation (RMSEA) should be less than 0.05, with values less than 0.08 representing reasonable fit (Kline, 2015), and the standardized root mean square residual (SRMR) should be less than 0.08, representing reasonable fit (Byrne, 2012). To test whether the fit of the model was equivalent across sex, we used the Satorra–Bentler  $\chi^2$  difference test (S-B  $\chi^2$ ) (Cheung & Rensvold, 2002), and differences in CFI ( $\Delta$ CFI), RMSEA ( $\Delta$ RMSEA), and SRMR ( $\Delta$ SRMR) between the models. If the differences in model fit indices exceeded the following criteria, the null hypothesis of invariance was rejected:  $\Delta$ CFI  $\geq$  -0.010,  $\Delta$ RMSEA  $\geq$  0.015, and  $\Delta$ SRMR  $\geq$  0.030 (Cheung & Rensvold, 2002; Kline, 2015). If criteria are met the null hypothesis of invariance was rejected.

With respect to the reliability of the developed scale, the intraclass correlation coefficients were calculated (ICCs; Shrout & Fleiss, 1979). The ICC represents consistency within the measure. If the ICC value was greater than or equal to 0.70, test-retest reliability was considered to be sufficient (e.g., Landis & Koch, 1977). For the relationships between identity process and daily emotions, the correlation coefficients were calculated.

To achieve the first research objective, the correlation coefficients between identity processes and daily emotions were calculated. A mean score across days for identity processes and daily emotions was used. For the second research objective, the relationships between identity profiles and positive and negative emotions were examined. In this analysis, a mean score across days for identity processes and daily emotions was used. First, to identify the identity profiles, latent profile analysis was used (LPA; Lanza et al., 2003). LPA groups individuals on the basis of empirically distinct patterns of scores on the variables (i.e., identity processes). The continuous scores for each of the

identity dimensions within each profile represent the measurement parameters, whereas the structural parameters refer to the profile membership probabilities assigned to groups of individuals (Nylund et al., 2007). The Sample Size Adjusted Bayesian Information Criterion (SSABIC), the bootstrapped likelihood ratio test (BLRT; Nylund et al., 2007), and entropy were used to determine the number of profiles. The lower the SSABIC value, the better the model fits the data; a significant BLRT score indicates that a model with  $k$  profiles fits better than that with  $k-1$  profiles. Entropy ranges from 0.00 to 1.00, with values greater than or equal to 0.75 indicating accurate classification (Reinecke, 2006). Furthermore, if the number of participants in a profile is too small, it is difficult to replicate that profile. Hence, this study included the criterion that all profiles needed to include at least 5% of the participants (Muthén & Muthén, 2000). In addition to these criteria, the number of profiles was determined based on theoretical interpretation.

Second, to assess the relationships between identity profiles and daily emotions, the R3STEP command in Mplus was employed for membership prediction, using multinomial logistic regression analyses (Asparouhov & Muthén, 2014). This analysis assumes that daily emotions predict identity profiles. However, since this study simultaneously measures identity dimensions and daily emotions, it is not appropriate, nor is it the purpose of this study to refer to the direction of associations. Therefore, this study's results are discussed without reference to the direction of associations between identity profiles and daily emotions.

## Results

### Preliminary Analyses

To test the factorial structure of the measure to assess identity process at the daily level, the CFA, including the five identity dimensions, was estimated. However, this model did not converge as the latent covariance matrix was not positive. This model convergence problem was caused by the latent correlations between commitment making and identification with commitment, which were exceedingly high (i.e., 0.99), and the correlation between in depth and in breadth exploration was above 1.00 (i.e., 1.02). Hence, in this study, one latent variable was constructed from the commitment making and identification with commitment items (i.e., commitment), and one latent variable was constructed from the exploration in breadth and exploration in depth items (i.e., active exploration) (Fig. S2). In this model, the mean values of commitment making and identification with commitment items on the same day (e.g., Monday) loaded on the commitment factor, whereas the mean values of exploration in breadth and in

depth items on the same day loaded on the active exploration factor. As a result, the CFI, RMSEA, and SRMR met the criteria (Table 1); thus, the three-factor model, which is the commitment, active exploration, and ruminative exploration model, was adopted. Furthermore, we conducted measurement invariance tests across sex. Scalar measurement invariance was supported, as the  $\Delta S-B \chi^2$  test was not significant at any stage of measurement and the  $\Delta CFI$ ,  $\Delta RMSEA$ , and  $\Delta SRMR$  values met the established criteria (Table 1).

**Descriptive Statistics and Test–Retest Reliability**

Table 2 presents the means, standard deviation values, and ICC for each item score. The ICCs ranged from 0.82 to 0.86 (for commitment, ICC = 0.84, 95% CI [0.80–0.88]; for active exploration, ICC = 0.82, 95% CI [0.77–0.86]; for ruminative exploration, ICC = 0.86, 95% CI [0.82–0.89]).

**Correlations between Identity Processes and Emotions**

Table 3 presents the correlations between the weekly means of identity process and daily emotions. Commitment was positively related to life satisfaction ( $r = 0.72, p < 0.001$ )

and happiness ( $r = 0.52, p < 0.001$ ), and negatively associated with anxiety ( $r = -0.31, p < 0.001$ ) and depression ( $r = -0.24, p = 0.004$ ). Active exploration was negatively related to happiness ( $r = -0.16, p = 0.049$ ), and was positively related to anxiety ( $r = 0.46, p < 0.001$ ) and depression ( $r = 0.43, p < 0.001$ ). Ruminative exploration was negatively associated with life satisfaction ( $r = -0.42, p < 0.001$ ) and happiness ( $r = -0.49, p < 0.001$ ), while it was positively related to anxiety ( $r = 0.82, p < 0.001$ ) and depression ( $r = 0.70, p < 0.001$ ).

**Identity Profiles**

LPAs were performed to extract the identity profiles at the daily level. From the criteria described in the Methods section, a solution with 2–6 profiles fit the data (Table 4). From the SSABIC and Entropy values, the 5 and 6 profile solutions were acceptable. For the 6-profile solution, one class included less than 5% of the number of participants (i.e., 2.2%) (Table 5). Consequently, the 5-profile solution was selected.

Table 6 and Fig. S3 present estimated means for all profiles. Profile 1 (20.8% of the participants) consisted of individuals scoring moderately high on commitment and low on active and ruminative exploration: a *foreclosure*

**Table 1** Fit indices of three-factor model and measurement model

	S-B $\chi^2$	$\Delta S-B\chi^2$	$\Delta df$	$p$	CFI	$ \Delta CFI $	RMSEA [90% CI]	$ \Delta RMSEA $	SRMR	$ \Delta SRMR $
Three-factor model	392.822	–	–	–	0.901	–	0.070 [0.063, 0.077]	–	0.051	–
Gender invariance (Males = 329; Females = 392)										
Configural invariance	506.893				0.895		0.073 [0.066, 0.080]		0.062	
Metric invariance	518.424	4.67	12	0.968	0.895	0.000	0.070 [0.063, 0.078]	0.003	0.062	0.000
Scalar invariance	532.150	15.53	24	0.904	0.895	0.000	0.068 [0.061, 0.075]	0.005	0.063	0.001

*S-B $\chi^2$*  Satorra–Bentler adjusted  $\chi^2$  test statistic,  $\Delta S-B\chi^2$  change in S-B $\chi^2$ ,  $p$   $p$  value across model comparisons, based on S-B $\chi^2$  difference, testing ( $\Delta S-B\chi^2$ ), *CFI* comparative fit index, *RMSEA* root mean-square error of approximation and 90% confidence interval, *SRMR* standardized root mean-square residual,  $\Delta$  change in parameter

**Table 2** Descriptive Statistics and ICCs

	Day 1 ( <i>N</i> = 281)		Day 2 ( <i>N</i> = 402)		Day 3 ( <i>N</i> = 659)		Day 4 ( <i>N</i> = 648)		Day 5 ( <i>N</i> = 640)		a week ( <i>N</i> = 150)		ICC (95% CI)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Identity processes													
Commitment	2.15	0.98	2.17	0.93	2.19	0.98	2.20	0.96	2.26	0.99	2.16	0.77	0.86 (0.82–0.89)
Active exploration	2.71	1.17	2.67	1.12	2.68	1.16	2.66	1.15	2.72	1.14	2.67	0.93	0.89 (0.84–0.91)
Ruminative exploration	2.99	1.34	3.04	1.28	2.96	1.27	2.85	1.32	2.88	1.28	2.91	1.03	0.86 (0.82–0.89)
Daily emotions													
Life satisfaction	2.41	1.15	2.48	1.14	2.43	1.15	2.54	1.18	2.53	1.17	2.47	0.91	0.86 (0.82–0.89)
Happiness	2.82	1.17	2.90	1.16	2.89	1.20	2.96	1.26	2.88	1.19	2.84	0.96	0.87 (0.83–0.90)
Depression	2.59	1.28	2.72	1.31	2.68	1.32	2.60	1.34	2.73	1.32	2.63	1.09	0.88 (0.84–0.91)

*M* mean, *SD* standard deviation, *ICC* intraclass correlation coefficient

profile. Profile 2 (15.8% of the participants) comprised those scoring relatively high on active exploration and ruminative exploration and low on commitment: a *moratorium* profile. Profile 3 (6.2% of the participants) comprised those scoring relatively high on ruminative exploration and low on commitment and active exploration: a *troubled diffusion* profile. Profile 4 (41.6% of the participants) consisted of those scoring moderately high on all identity processes: a *searching moratorium* profile. Profile 5 (15.5% of the participants) consisted of participants scoring low on all identity processes and was interpreted as a *carefree diffusion* profile.

### Associations between Identity Profiles and Emotions

Tables 7 and 8 shows the exact parameter estimates for the associations of daily positive and negative emotions with the identity profiles. For example, when *carefree diffusion* was used as the reference profile, individuals with a high level of life satisfaction had a 4.53 times higher probability of belonging to *Foreclosure* (Table 7). Summarizing the results in Tables 7 and 8, participants with high life satisfaction were most likely to belong to *foreclosure*, followed by *searching moratorium*, and least likely to belong to *carefree diffusion*, *moratorium*, and *troubled diffusion*. Participants with a high level of happiness tended to belong to *carefree diffusion*, *foreclosure*, or *searching moratorium* more often than *troubled diffusion* and *moratorium*. Participants with high levels of depression had a high probability

of belonging to *troubled diffusion* and *moratorium*, followed by *searching moratorium*, *foreclosure*, and *carefree diffusion*, in that order.

### Discussion

Young adulthood is a key period in identity development, closely linked to patterns of emotions during the life span. Specifically, the exploration of and commitment to future plans and goals that relate to one's identity is important in the healthy development of young adults. Long-term longitudinal studies have demonstrated that the developmental trajectories of identity processes vary from person to person and are interrelated with psychosocial functioning (Luyckx et al., 2013). To shed light on the mechanisms of identity development, this study focused on the identity processes in future domain at the daily level. To this end, the associations with identity processes, profiles and emotions at daily level were examined. The results showed that identity process in future domain and psychosocial functioning are strongly related at the daily level.

### Daily Identity Processes and Emotions

The results of the factor analysis showed that the three-factor model, including commitment, active exploration, and ruminative exploration indicated the best fit to the data. This result suggests that the three-factor model (e.g., Crocetti, 2017) may be more parsimonious than the five-dimensional model in assessing this domain at the daily level in Japanese young adults. Furthermore, the result, that commitment making and identification with commitment, and exploration in breadth and exploration in depth, have been combined into a single factor, suggests that it might be difficult for Japanese young adults to clearly distinguish between their commitment formation (e.g., commitment making) and evaluations (e.g., identification with commitment) at the daily level. In Japan, young adulthood is the period of transition from school to work (Hatano et al., 2022), and it is a time to explore and make decisions about one's future-oriented goal (e.g., work, marriage), as well as a time to evaluate those decisions.

**Table 3** Correlations between identity processes and daily emotions ( $N = 150$ )

	2	3	4	5	6
1. Commitment	0.28**	-0.18*	-0.72***	-0.52***	-0.24**
2. Active exploration	–	0.63***	-0.02	-0.16*	-0.43***
3. Ruminative exploration		–	-0.42***	-0.49***	-0.70***
4. Life satisfaction			–	-0.83***	-0.50***
5. Happiness				–	-0.66***
6. Depression					–

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

**Table 4** Fit statistics for 1–6 class latent profile analysis (LPAs)

Fit statistics	1-class	2-class	3-class	4-class	5-class	6-class
SSABIC	5933.051	5497.414	5344.651	5298.469	5183.706	5098.004
Entropy	–	0.783	0.769	0.796	0.799	0.828
BLRT $p$ value	–	<0.001	<0.001	<0.001	<0.001	<0.001
Log likelihood	-2956.309	-2956.309	-2731.680	-2648.488	-2598.341	-2560.950

SSABIC sample size adjusted Bayesian Information Criterion, BLRT bootstrapped likelihood ration test



The results of the test of measurement invariance for sex suggest that there may not be significant differences in factor loadings (i.e., metric level) and item intercepts (i.e., scalar level) in the three factors across sex groups. Hence, it is possible to compare the associations between identity processes and other outcomes, and the means of identity process scores across sex. Furthermore, the ICC values for each item were all above 0.70; hence, the test-retest reliability of all the items was confirmed.

With respect to the relationships between identity dimensions and daily emotions, as predicted, commitment was positively and negatively associated with participants' positive and negative emotions, respectively. Moreover,

when compared to this relationship, ruminative exploration was inversely associated with positive and negative emotions. Furthermore, active exploration was positively related to negative emotions. These findings are consistent with long-term studies, suggesting that identity processes and emotions are strongly related, even in the short-term, at a daily level.

**Daily Identity Profiles**

Five identity profiles were identified instead of seven profiles: *troubled diffusion*, signifying those who ruminate and worry about the future; *foreclosure*, representing young adults who feel secure about their future and do not look for an opportunity to address the issue of identity; *moratorium*, representing young adults searching for commitment; *searching moratorium*, signifying those who have a certain sense of security in their future plans, but at the same time are looking for another opportunity; and *carefree diffusion*, denoting those who avoid confronting identity issues for the future-oriented goal. The findings suggest that these five profiles may also be found at the everyday level in Japan.

The largest percentage of young adults was classified in the *searching moratorium* profile. Young adults with a *searching moratorium* profile feel secure about their future, but explore (and ruminate about) new possibilities as well. This result closely reflects the situation in Japan, where an increasing number of young adults are exploring new possibilities that match their own aptitudes (Cabinet Office 2019). Furthermore, *searching moratorium* and *moratorium* profiles constituted more than half of the total participants. This suggests that young adulthood may be a time in Japan when many young people are searching for their future goals at the daily level.

Unexpectedly, an *achievement* profile was not found. There are two possible explanations for this result. First, it is possible that there may be few young people with *achievement* profiles at an everyday level in Japan. Individuals with an *achievement* profile are not anxious about their future-oriented goals and seek to deepen their current

**Table 5** Identity profile prevalence

Profile prevalence (%)						
Solution	1	2	3	4	5	6
Profile 2	34.6	65.4				
Profile 3	53.4	27.3	19.4			
Profile 4	50.5	26.8	20.3	2.5		
Profile 5	15.5	20.8	41.6	6.2	15.8	
Profile 6	15.4	20.4	43.8	7.2	11.0	2.2

**Table 6** Final parameter estimates of latent profile analysis in identity processes

	Committment	Active exploration	Ruminative exploration
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Foreclosure	2.39 (0.11)	2.22 (0.10)	2.19 (0.10)
Moratorium	2.17 (0.14)	4.01 (0.12)	4.35 (0.09)
Troubled diffusion	1.37 (0.06)	1.87 (0.27)	3.87 (0.36)
Searching moratorium	2.53 (0.03)	3.11 (0.06)	3.23 (0.08)
Carefree diffusion	1.52 (0.08)	1.30 (0.05)	1.37 (0.08)

*M* mean, *SD* standard deviation

**Table 7** Raw parameter estimates and odds ratios representing roles of daily emotion on daily identity profiles membership with the carefree diffusion profile as a reference group

Model	Reference Carefree diffusion											
	vs foreclosure			vs searching moratorium			vs troubled diffusion			vs moratorium		
	Estimate	SE	OR	Estimate	SE	OR	Estimate	SE	OR	Estimate	SE	OR
Life satisfaction	1.51**	0.56	4.53	1.13*	0.45	3.01	-1.07*	0.43	0.35	-0.12	0.35	0.89
Happiness	0.22	0.22	1.25	0.07	0.17	1.08	-1.30***	0.36	0.27	-0.79***	0.22	0.45
Depression	1.74***	0.40	5.68	3.19***	0.45	24.20	-4.81***	0.65	122.70	-5.01***	0.57	150.31

*SE* standard error, *OR* odds ratio

\**p* < 0.05, \*\**p* < 0.01, \*\*\**p* < 0.001

**Table 8** Raw parameter estimates and odds ratios representing roles of daily emotion on daily identity profiles membership with the foreclosure, searching moratorium and troubled diffusion profiles as a reference group

Model	Reference foreclosure						Reference searching moratorium						Reference troubled diffusion						
	vs searching moratorium		vs troubled diffusion		vs moratorium		vs troubled diffusion		vs moratorium		vs moratorium		Estimate	SE	OR				
	Estimate	SE	OR	Estimate	SE	OR	Estimate	SE	OR	Estimate	SE	OR							
Life satisfaction	-1.51**	0.56	0.68	0.17	0.08	0.20	-1.63**	0.43	0.43	0.20	-2.20***	0.40	0.11	-1.25***	0.35	0.29	0.94*	0.38	2.57
Happiness	-0.15	0.13	0.86	-1.53***	0.34	0.22	-1.02***	0.19	0.36	0.36	-1.38***	0.33	0.25	-0.87***	0.17	0.42	0.51	0.33	1.67
Depression	1.45***	0.27	4.27	-3.07***	0.55	21.62	-3.28***	0.45	26.49	26.49	-1.62***	0.418	5.07	-1.83***	0.3	6.21	0.20*	0.348	1.23

SE standard error, OR odds ratio

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ 

commitments. In Japan, young adulthood is a period characterized by deciding on a career for university students and adjusting to new work environments for workers (Hatano et al., 2022). Hence, young adults who have secured their future-oriented goals, such as getting married or finding the job they wanted, may not be willing to explore their future further (i.e., *foreclosure* profile). Specifically, conservative young people who believe that their future is evident once they secure a job or get married may not actively explore it. Consequently, not finding a single *achievement* profile suggests that there may be few young people in Japan who feel secure in their future plans on a daily basis but who nevertheless explore their possibilities without anxiety. Second, it is possible that the profile obtained in this study could differ from the identity profile based on the five-dimensional model. In the present study, the identity profiles were identified based on the combination of commitment making and identification with commitment, and of exploration in breadth and depth, respectively, into a single concept. This model differs from the five-dimensional model the original identity profile is based on. These differences may be reflected in the results indicating a lack of *achievement* profile.

### Daily Identity Profiles and Emotions

The relationship between identity profile and emotion was generally as expected. The participants with a *foreclosure* profile had the highest level of life satisfaction. Thus, young adults with a *foreclosure* profile may be mentally healthier than those with other profiles, possibly because the *foreclosure* profile is characterized by being secure in one's future-oriented goal and there is no exploring of new possibilities (Luyckx et al., 2008). The high level of security about the future-oriented goal is expressed in the high level of life satisfaction and low level of negative emotions compared to the other profiles.

The participants with a *troubled diffusion* or *moratorium* profile tended to have the lowest happiness and the highest depression compared to those with the other profiles. These findings suggest that young adults who are exploring and ruminating to address identity issues for the future-oriented goal may be at greater risk of mental health issues than those who are not. Specifically, young adults who indicated lower life satisfaction belonged to the *troubled diffusion* profile rather than *moratorium* profile. The results suggest that young adults with *troubled diffusion* profile may be at the highest risk with regard to psychosocial health, both in terms of positive and negative emotions.

Participants with a *searching moratorium* profile had higher levels of positive emotions compared to *carefree diffusion*, *moratorium*, and *troubled diffusion* profiles. However, they also displayed higher levels of negative

emotions when compared to *foreclosure* and *carefree diffusion* profiles. This result suggests that *searching moratorium* young adults may feel conflicting emotions on a daily basis. The *searching moratorium* profile has been described as having both bright and dark sides for identity development (Schwartz et al., 2011). Overall, the results suggest that this profile of young adults may have stronger positive and negative emotions than the other profiles, even at the everyday level.

Participants with the *carefree diffusion* profile had intermediate positive emotions compared to those with other profiles, but contrary to expectations, they were the lowest in experiencing negative emotions. This result suggests that young adults with *carefree diffusion* may not experience strong positive emotions on a daily basis, but at the same time, they may not feel negative emotions too strongly either. The *carefree diffusion* profile denotes those who experience neither security nor rumination about the future, and represents young adults that are not invested in identity issues (Luyckx et al., 2008). Specifically, young adults with a *carefree diffusion* profile are those who do not actively choose an identity for the future-oriented goal (Luyckx et al., 2008). The results of this study identify this type at the everyday level as well and reveal its characteristics in relation to psychosocial functioning.

### Developmental Implications

The present findings provide valuable implications for identity development in young adulthood. First, by identifying identity profiles at a daily level, this study revealed individual differences among Japanese young adults in addressing identity issues related to their future goals. Previous research on long-term identity development has shown that identity profiles can be categorized into mostly five to seven types, including an *achievement* profile (Luyckx et al., 2013; Schwartz et al., 2011). However, the present study did not find an *achievement* profile. Considering that longitudinal studies are subject to retrospective bias (e.g., Klimstra et al., 2010), the results from this study may more accurately reflect the reality of Japanese young adults' identity profiles. Specifically, while 20% of the participants were classified as having a *foreclosure* profile, approximately more than half and 30% had profiles related to the *moratorium* and *diffusion* profiles, respectively. These findings suggest that there are a certain number of young adults whose issues with future-oriented goals are shrinking, but most Japanese young adults continue to work on and struggle with identity problems with future-goals at the daily level in Japan. These findings also suggest that Japanese context may be characterized by certain levels of daily identity uncertainty in young adulthood.

Second, this study clarified the relationship between identity processes, profiles, and emotions at the daily level. The findings related to associations between identity dimensions and profile, as well as positive and negative emotions, were generally consistent with those of other studies of long-term identity development. These findings suggest that identity process and psychosocial functioning are strongly linked, even at the daily level, and that commitment and ruminative exploration, in particular, may play important roles in high and low psychological functioning.

Third, this study made it possible to examine young adult's future goals at a daily level amidst changing social conditions in Japan. Traditionally, young adulthood is a time of identity formation, and young adults are expected to clarify their future goals as they transition into adulthood. However, whether a young adult has clear goals for the future strongly depends on social conditions. For example, after 2020, the spread of COVID-19 infection has made it extremely difficult for young adults to have clear future goals (Lee et al., 2021). In such a situation, it is necessary to examine not only the normative developmental change of making goals for the future, but also the atypical development of how young people form their identity in society. In doing so, the results of this study can be used as a benchmark for young adults prior to the spread of COVID-19 infection and can be compared with later results.

### Limitations and Future Directions

This study has some limitations. First, the relationship between long-term identity development and short-term identity processes needs to be examined. The measure developed in this study has not been examined in relation to the full version of DIDS. Hence, the relationship between the two variables needs to be investigated. Second, the validity of the factor structure needs to be further examined. As this study was conducted with a sample of Japanese young adults, it is unclear whether the results can be replicated for the young adults in other countries. Third, the survey was limited to a specific time period. The survey was conducted at a time when there were no major social changes and when young people were expecting changes for the future. However, after 2020, when the spread of COVID-19 continues, attitudes toward future goals are likely to have changed significantly. In addition, respondents' attitudes toward future goals are strongly associated with events that occurred on the day they responded to the survey. Future research should examine the relationship between young people's attitudes toward the future and changes in social circumstances, as well as their relationship to life events, by comparing survey results from different time periods. Fourth, identity and emotions were assessed using self-report. Identity is subjective; hence, self-report is

the most suitable procedure. Nevertheless, to provide strong evidence, future research should include other reported measures to corroborate the obtained findings.

## Conclusion

The process of exploring and committing to one's identity for the future-oriented goal is important for young adults' psychosocial functioning. Research on identity process in young adulthood have focused on the yearly relationships between identity process and psychosocial functioning. Yet, the daily identity processes and their associations with daily emotions in young adulthood have not been explored. To address the research gap, this study focused on identity processes in the future domain at the daily level and their associations with positive and negative emotions. Corroborating previous long-term studies, the present study revealed that at a daily level, higher levels of commitment to future goals were associated with higher levels of daily satisfaction and happiness, whereas ruminative exploration was associated with lower levels of daily satisfaction and happiness and higher levels of depressive mood. In addition, higher levels of active exploration were associated with higher levels of depressive mood. Furthermore, the latent profile analysis extracted five profiles of identity dimensions at the daily level. Although these profiles were partially consistent with long-term identity research, they differed in that the current research did not extract an *achievement* profile. In this respect, this study suggests that Japanese young adults may not routinely derive a sense of security and active exploration from their future goals at the daily level. Specifically, most young adults were found to belong to the *searching moratorium* profile. This may represent the characteristics of Japanese young adults who are still searching for their future-oriented goals over a long period of time. Furthermore, identity profiles were found to be strongly associated with daily emotions. These findings shed light on previously unknown aspects of identity processes and profiles at a daily level and their relationship to psychosocial functioning in young adulthood. These outcomes have important implications for elucidating the mechanisms of identity development in young adulthood at the daily level.

**Authors' Contributions** K.H. conceived of the study, participated in its design and coordination and drafted the manuscript; K.L. conceived of the study, and participated in its design and coordination and helped to draft the manuscript; S.H. conceived of the study, and participated in its design and coordination and helped to draft the manuscript; K.S. conceived of the study, and participated in its design and coordination and helped to draft the manuscript; A.B. conceived of the study, and participated in its design and coordination and helped to draft the manuscript. All authors read and approved the final manuscript.

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**Data Sharing and Declaration** This manuscript's data will not be deposited. The datasets generated and analyzed during the current study are not publicly available, but are available from the corresponding author upon a reasonable request.

## Compliance with Ethical Standards

**Conflict of Interest** The authors declare no competing interests.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study was approved by the formal Institutional Review Board of Osaka Prefecture University.

**Informed Consent** Informed consent was obtained from all participants included in the study.

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