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Short Communication

Exploration speed in Red Knots affects spring migration timing, but only after experimentally constrained fuelling conditions

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Individual variation in avian migration timing is still poorly understood, yet recent evidence shows that it is closely linked to personality traits and may also be affected by food availability. Here, we examined how the interaction of the personality trait exploration speed and food availability affected the departure timing of Red Knots *Calidris canutus* from their wintering grounds. Using experimental manipulations of food access and measures of exploration speed in captivity followed by tracking of released individuals, we show that fast-exploring birds departed later but only when subjected to restricted food access in the experiment, whereas birds with unlimited food access showed no personality-dependent differences in departure timing. Our results suggest that personality does not reflect intrinsic variation in spring migration timing, but rather interactions with environmental variation affecting the birds' ability to refuel body stores after food restrictions.

Keywords: food availability, personality, phenology, Wadden Sea, waders.

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Through long-distance migrations, animals take advantage of seasonal variations in resource availability along their migratory pathways (Holt & Fryxell 2011), seeking favourable conditions for reproduction and non-reproductive periods to enhance their survival (Fokkema *et al.* 2020). Animals start migration by making preparations for these long journeys; apart from physiological changes (Maggini *et al.* 2022), the acquisition of energy reserves is one of the most essential components (Lindström *et al.* 2019). Rapid energy deposition is achieved through increased energy intake rates via intensified feeding (premigratory hyperphagia (Odum 1960)), enhanced energetic efficiency (Guillemette *et al.* 2012, Schindler *et al.* 2024) and dietary shifts to more energy-rich resources (Mcwilliams *et al.* 2004), all of which are non-mutually exclusive. The decision to depart on migration is based on the combination of the endogenous migration programme (Bairlein & Gwinner 1994, Coppack *et al.* 2008), indicative of the right time of year, and available energy reserves (Bridge *et al.* 2010, Cooper *et al.* 2015), with last-minute changes often modulated by weather conditions (Dänhardt & Lindström 2001) and social cues (Piersma *et al.* 1990).

While controlling for these factors, there may still be substantial individual variation in migration timing, for example, when individuals respond differently to the same cues (Burnside *et al.* 2021). This can have knock-on effects on reproductive success if late arrival at the breeding grounds leads to a mismatch in the timing relative to conspecifics (Kokko 1999, Drent *et al.* 2003) or local food resources (Lameris *et al.* 2018a). Nowadays, individual variation in traits is increasingly explained as being linked to individual personalities (Gosling 2001, Dingemanse *et al.* 2003, Ersoy *et al.* 2024), defined as time-consistent behavioural traits that vary among individuals and affect behavioural expressions across situations (Gosling 2001). Personality traits such as exploration (Réale *et al.* 2010) may have significant implications on varying life-history aspects, as illustrated by fast- and slow-exploring Red Knots *Calidris canutus*, which differ in their foraging tactics and diet (Bijleveld *et al.* 2014, Ersoy *et al.* 2022).

Exploration speed can affect migratory behaviour, particularly migration timing. More exploratory individuals tend to cover large areas (Dingemanse *et al.* 2003, Herborn *et al.* 2010), which may lead to a larger number of staging sites used or more time spent at the same site during migration (Chan 2021, Vervoort *et al.* 2022), ultimately leading to differences in migration timing (Ersoy *et al.* 2024). In Red Knots, for example, fast-exploring individuals arrive later in the Wadden Sea following post-breeding migration (Ersoy *et al.* 2024). This delay has been attributed to either departing later from their breeding sites, using more stopovers during migration or a combination of the two (Ersoy *et al.* 2024). Since exploration speed is known to affect foraging

tactics and diet, subsequent effects on energy acquisition and expenditure may explain inter-individual variation in migration departure and timing. However, the mechanism behind such effects of personality on migration timing remains unknown.

We study the effect of individual variation, specifically exploration as a personality trait, on the timing of prebreeding migration departure of Red Knots wintering in the Dutch Wadden Sea. We use an experimental approach, in which the levels of food availability prior to migration are manipulated, and test how personality and food access may interactively affect migration timing. This allows us to uniquely distinguish whether variation in migration timing among individuals with different personalities arises from different migration preparation strategies or is linked to how individuals cope with and recover from food restrictions. Fast-exploring individuals can make more stopovers during migration (Chan 2021, Vervoort *et al.* 2022, Ersoy *et al.* 2024), which may lead to the expectation that they also depart on migration earlier. If personality-dependent variation in migration timing and stopover use is caused by inherently different strategies, we would expect a similar effect of personality on departure timing across different levels of food availability. Alternatively, if personality-dependent migration timing relates to foraging strategies and therefore fuelling rates, we would expect effects on timing to differ depending on food availability, which could provide important insights into the role of individual-level behavioural traits in shaping migratory animals' responses to fluctuating or changing environmental conditions.

METHODS

Study species and population

We studied Red Knots of the subspecies *islandica*, which spend the wintering season mostly in the Wadden Sea area in northwestern Europe (Piersma 2007, Buehler & Piersma 2008). Birds start depositing energy stores for migration from mid-April onwards and depart from the Wadden Sea between early and late May. They typically use stopover sites in either Iceland or northern Norway (Wilson *et al.* 2011), after which they fly to their breeding grounds in Greenland and northeast Canada (Davidson & Wilson 1992).

Bird capture and housing conditions

For this study, a total of 59 Red Knots were captured using mist-nets on the island of Griend (53°15′N, 5°15′E) in the Dutch Wadden Sea in autumn and winter (September–January) of 2021 and 2023. Upon capture, we weighed birds, measured biometrics and extracted small blood samples (<75 μL) for molecular sexing (van der Velde *et al.* 2017). Only adult birds were included in the experiment as younger birds are more likely to over-summer in their non-breeding range rather than migrate (Martínez-Curci *et al.* 2020). All birds were housed in outdoor aviaries (7–8 birds per aviary) at the NIOZ Royal Netherlands Institute for Sea Research (3°00′12.1″N, 4°47′23.3″E) on the island of Texel, The Netherlands, following the methods described in Buehler and Piersma (2008) and Vézina *et al.* (2009). Within the aviaries, the birds were fed trout food pellets and had continuous access to freshwater for drinking, including a separate tray for bathing. More details on the housing conditions at the NIOZ are provided in Bijleveld *et al.* (2014) and Kok *et al.* (2019). In the aviaries, we measured body mass and body plumage moult twice a week throughout the experiment. Body plumage moult was not used in the present study and is described in further detail in Lameris *et al.* (2025).

Experimental setup

We conducted experiments in the winter and early spring of 2022 and 2023, in which we manipulated time access to food during prenuptial moult and fuel storage. Birds were randomly assigned to three treatment groups with varying food accessibility: 6, 12 or 24 h per day. The 6-h and 12-h treatments represented restricted food access, with the 12-h treatment mirroring the natural foraging time of Red Knots in a tidal regime (Piersma *et al.* 1994, Bulla *et al.* 2017). The 24-h treatment represented unlimited access to food. Food was provided through automated cat feeders (Cat Mate C300, closerpets.eu). Because Red Knots can forage both by day and night (Piersma *et al.* 1994), food in the 6- and 12-h treatments was accessible at night between 12:00 AM and 06:00 AM and 6:00 PM and 06:00 AM (UTC), respectively, to minimise overlap with the bi-weekly measurements. Two to three feeding units were used per aviary to reduce competition between individuals (Bijleveld *et al.* 2012). Treatments started in early January (2022) or late January (2023) to allow varying responses to varying food abundance, including an advancement in the onset of fuelling, and lasted until 29 April, after which birds were released back into the wild. Birds were captured and weighed twice a week (Tuesdays and Fridays) for the entire duration of the experiment. We compiled trajectories of body mass for each individual bird, from which we determined the start and end of rapid body mass gain (>0.5 g day^{-1}) as well as the mass gain rate for each individual (Lameris *et al.* 2025). These trajectories indicated that body mass gain differed only as a function of treatment, with no detectable influence of feeding time, handling or other factors (Lameris *et al.* 2025).

Measuring exploration speed

In February 2022 and 2023, we tested the personality trait of exploration speed for each individual according to the methods described in Bijleveld *et al.* (2014) and Ersoy *et al.* (2022). Personality experiments were conducted in a 7 × 7 m arena, containing five 1 × 1 m trays filled with wet sand. The remainder of the arena was a sand layer topped with 30 cm of fresh sea-water. A GoPro mounted on the ceiling recorded the birds' movement behaviour. Prior to the trials, birds were deprived of food access for 1–5 h, between 7 AM and 1 PM. This range reflects a trade-off between testing many individuals per day and maintaining similar deprivation times across birds, while remaining within naturally occurring (i.e. tidal) periods of food deprivation. Testing order was randomised to avoid bias, following established protocols using the exact same approach (e.g. Bijleveld *et al.* 2014, Ersoy *et al.* 2022, Roncoroni *et al.* 2024). During the trials, a single bird was released into the arena and was taken out after 20 min. Movement videos recorded with the GoPro cameras were stored and analysed in May 2023 using idTracker 2.1 (Pérez-Escudero *et al.* 2014), which produced position data (i.e. *x*- and *y*-co-ordinates) at 0.5-s intervals throughout the experiment. The resulting tracks were used to calculate a mean exploration speed (in $\log_{10}$ cm s^{-1}) per trial. Extensive details on the experimental setup and analyses are provided in Bijleveld *et al.* (2014), Kok *et al.* (2019) and Ersoy *et al.* (2022). For five birds. we were unable to determine the exploration speed, as birds did not land on one of the platforms, in which case we ended the trial after 5 min. These birds were excluded from the analysis (three birds from the 12-h and one from the 24-h treatment group in 2022, and one bird from the 24-h treatment group in 2023).

Tracking migratory departure

On 29 April 2022 and 2023, we released 27 and 32 birds, respectively, in the Wadden Sea. Each bird was equipped with two radio transmitters: 4 g WATLAS (Bijleveld *et al.* 2022) and 0.6 g Lotek nanotags operating in the MOTUS network (Taylor *et al.* 2017). The WATLAS transmitters were attached to the skin of the birds' rump using cyanoacrylate glue after trimming the feather vanes in a small circular area matching the size of the transmitter, and the smaller and lighter MOTUS transmitters were subsequently glued on top of the WATLAS transmitters. The total weight of the tags relative to body mass had a mean and median of 3.2% (range: 2.3–4.1%). Despite the relatively high tag-to-body-mass ratio in some individuals, previous studies using similar tags and ratios (up to 5% of body mass) in Red Knots in the Dutch Wadden Sea reported no abnormal behaviour or detrimental effects based on visual observations and resightings of tagged birds (Bijleveld *et al.* 2016, Oudman *et al.* 2016, 2018). Departure dates were determined using both WATLAS tracks and MOTUS detections, based on the last northward WATLAS localisation or typical 'departure event' patterns in MOTUS data (see Müller *et al.* 2018). In total, we excluded 12 birds from the analysis because we could not determine a reliable departure date. Importantly, the absence of a reliable departure date does not per definition imply that these individuals remained in the Wadden Sea over summer; nine individuals were excluded either due to a lack of detections (two from the 6-h and two from the 24-h treatment group in 2022, and three from the 6-h and two from the 24-h treatment group in 2023), indicating either transmitter failure, birds departing northwards from the eastern Dutch Wadden Sea where receiver coverage is poor, or birds remaining in the Wadden Sea. Three birds were excluded as they did not depart on migration (one from the 6-h and one from the 12-h treatment group in 2022, and one from the 24-h treatment group in 2023). More details on the methods of identifying departure dates, including tracks of all individuals, can be found in Lameris *et al.* (2025).

Ethics

Analyses in Lameris *et al.* (2025) showed no significant differences in departure dates between birds subjected to the 6- and 12-h treatments, while only the 24-h group departed significantly earlier. In addition, birds in the 6-h group did not depart less frequently from the Wadden Sea than birds in other treatment groups. Together, these results provide no indication that the 6-h treatment resulted in underfed birds, consistent with findings from similar experimental treatments in Red Knots (Vézina *et al.* 2009). All necessary permits to catch, handle, tag, test and keep Red Knots were given to the NIOZ by Dutch law and regulation under protocol number (AVD8020020171505: 6 September 2021, until 1 August 2022 and AVD80200202215943: 28 July 2022, until 27 July 2027).

Statistical analyses

Data from 41 individuals were included in the analyses; in addition to the aforementioned exclusions, one bird from the 24-h treatment group in 2022 was excluded due to unknown sex. All data processing was done in R v.4.2.2 (R Core Team 2023) using the package MuMIn (Bartoń 2026) for statistical analyses and ggplot2 (Wickham 2016) for data visualisations. We used a Partial Linear Regression to investigate the relationship between exploration and departure (Zuur *et al.* 2007). To

account for the effect of variation in mass deposition rates on departure timing in relation to treatment, as shown by Lameris *et al.* (2025), we first fitted linear models with body mass gain rate (*Rbm*), sex, year and treatment as predictor variables, and departure date (*DD* ~ *Rbm* + *Sex* + *Year* + *Treatment*) and exploration score (*Exp* ~ *Rbm* + *Sex* + *Year* + *Treatment*) as response variable. For each model, we obtained the residuals of the response variable, which isolates the information within each variable that is not explained by the set of predictor variables. Thereafter, we tested the additional effect of exploration on departure date by fitting models with the residuals of departure date as the response variable and the residuals of exploration as the predictor variable. We assessed model performance by comparing the AICc with a null model. We selected the best model as the one with either the lowest AICc by more than 2 ΔAICc or, if within 2 ΔAICc, the model containing fewer parameters (Arnold 2010). Previous analyses presented in Lameris *et al.* (2025) showed that birds in the 24-h treatment departed significantly earlier than those in the 12- and 6-h treatments, which were similar to each other and to wild birds. Therefore, we repeated the analyses for all treatments together (Table 1a) as well as separately for the 24-h treatment (Table 1b) and the 6- and 12-h treatments combined (Table 1c). To contextualise this approach, if the relationship between exploration and departure date was consistent across treatments, we expected exploration models to outperform null models in all groups; if the relationship was negligible, null models were expected to outperform exploration models throughout.

We also investigated whether exploration speed affected the change in body mass between capture and release using Generalised Linear Models. This analysis was motivated by previous work showing that exploration speed can influence foraging success of Red Knots in a social setting (Roncoroni *et al.* 2024). Specifically, we expected more explorative birds to be at a disadvantage under competition (Roncoroni *et al.* 2024), resulting in a lower body mass gain compared to less explorative individuals. Similar to the analyses of departure, we repeated this analysis for all treatment groups combined (Table 2a), the 24-h treatment only (Table 2b), and the restricted 6- and 12-h treatments combined (Table 2c).

Table 1. Outputs of the Partial Linear Regression models with the residuals of departure date as response variable and the residuals of exploration as predictor variable, including null models. Each set of models is repeated across the different treatment groups: (a) all treatments combined, (b) *ad libitum* food access (24-h treatment) and (c) restricted food access (6- and 12-h treatment). Each set is sorted by AICc. Models in bold were considered best-performing within their respective group: with ΔAICc > 2, or the most parsimonious model (lowest df) within ΔAICc < 2.

	Model	Degrees of freedom	Log likelihood	AICc	ΔAICc	Model weight
(a) All treatment groups combined	**Departure date ~ 1**	**2**	**−149.26**	**302.8**	**0.00**	**0.522**
	Departure date ~ Exploration	3	−148.18	303.0	0.18	0.478
(b) 24-h treatment group	**Departure date ~ 1**	**2**	**−43.74**	**92.8**	**0.00**	**0.861**
	Departure date ~ Exploration	3	−43.73	96.5	3.64	0.139
(c) 6- and 12-h treatment groups	**Departure date ~ Exploration**	**3**	**−97.90**	**202.8**	**0.00**	**0.889**
	Departure date ~1	2	−101.23	206.9	4.17	0.111

Table 2. Model outputs of the Generalised Linear Models with change in body mass as response variable and exploration as predictor variable, including null models. Each set of models is repeated across the different treatment groups: (a) all treatments combined, (b) *ad libitum* food access (24-h treatment) and (c) restricted food access (6- and 12-h treatment). Each set is sorted by AICc. Models in bold were considered best-performing within their respective group: with ΔAICc > 2, or the most parsimonious model (lowest df) within ΔAICc < 2.

	Model	Degrees of freedom	Log likelihood	AICc	ΔAICc	Model weight
(a) All treatment groups combined	**BM ~ 1**	**2**	**−174.440**	**353.2**	**0.00**	**0.76**
	BM ~ Exploration	3	−174.429	355.5	2.31	0.24
(b) 24-h treatment group	BM ~ Exploration	3	−49.607	108.2	0.00	0.531
	BM ~ 1	**2**	**−51.565**	**108.5**	**0.25**	**0.469**
(c) 6- and 12-h treatment groups	**BM ~ Exploration**	**3**	**−118.136**	**243.2**	**0.00**	**0.751**
	BM ~ 1	2	−120.491	245.4	2.21	0.249

RESULTS

The overall effect of exploration speed on departure date varied across treatment groups and years (Fig. 1a–f). In our residual analysis, exploration speed did not affect the departure date when the 6-, 12- and 24-h treatment groups were analysed together (Table 1a; Estimate = 6.36 ± 4.39 se). Similarly, we found no effect when analysing the 24-h treatment separately (Table 1b; Estimate = −1.17 ± 8.13 se). However, when combining

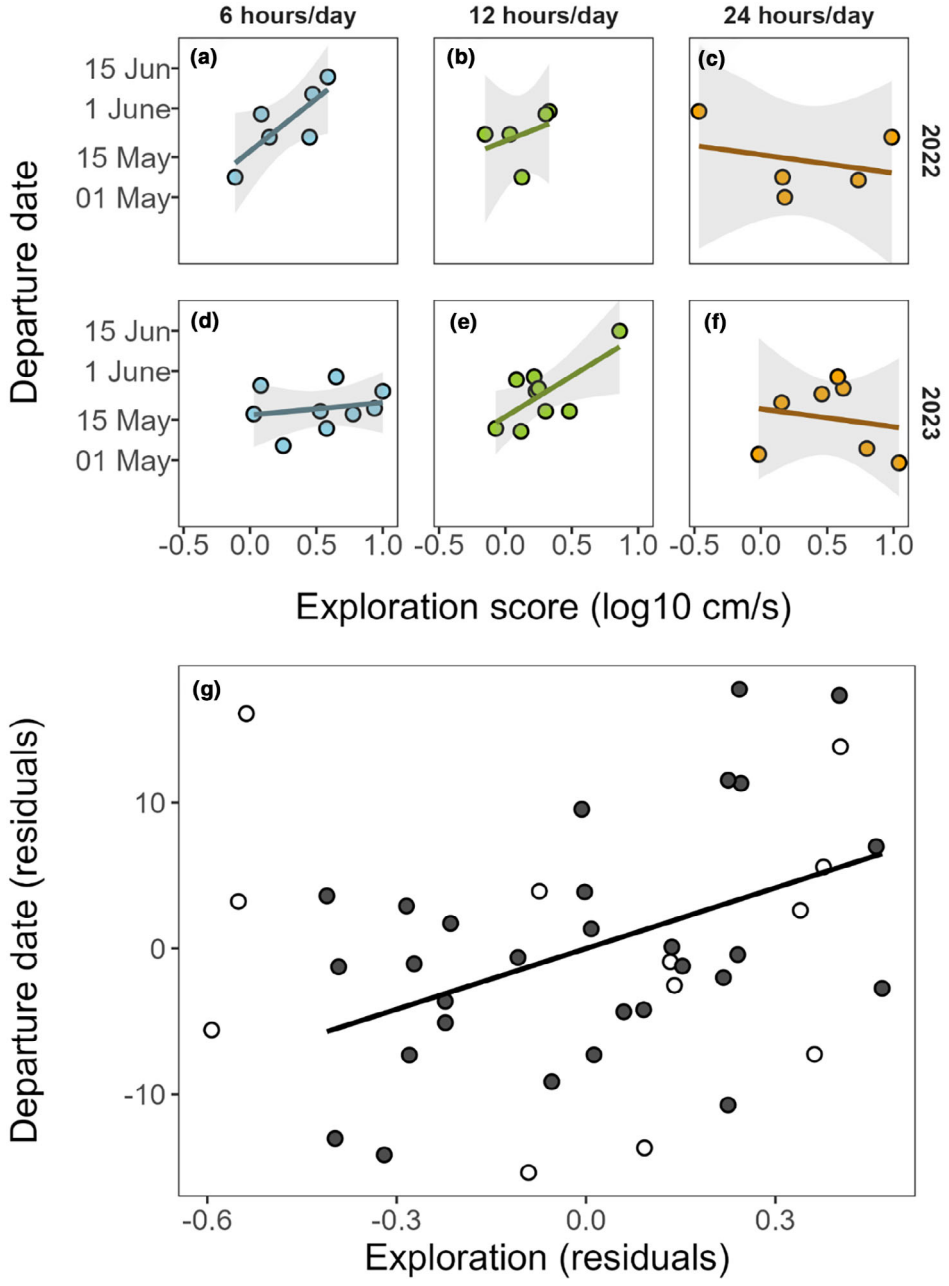

Figure 1. (a–f) Relationships between exploration scores and departure date across years and treatments, plotted using standard linear regression, and (g) the correlation between the residuals of exploration score and departure date, distinguishing between the 6- and 12-h treatments (dark grey) and the 24-h treatment (white). The black line represents the significant positive correlation found in the 6- and 12-h treatments only (Estimate = 13.88 ± 5.26 se).

only the 6- and 12-h treatments, exploration speed significantly affected departure date (Table 1c; Fig. 1g, Estimate = 13.88 ± 5.26 se).

In the generalised linear models testing the effect of exploration on body mass change, the null model outperformed the model including exploration as an explanatory variable both when all treatments were analysed together (Table 2a) and when only the 24-h treatment was considered (Table 2b). In contrast, within the model set considering only restricted food access (6- and 12-h treatments), the model including exploration as an explanatory variable outperformed the corresponding null model (Table 2c). This model showed a decrease in body mass with higher exploration speeds (estimate = −19.45 ± 8.91 se). This effect, however, appeared to be mainly driven by an apparent strong correlation of exploration and body mass change in the 12-h treatment in 2023 (Fig. 2e).

DISCUSSION

Contrary to our expectations of fast-exploring Red Knots departing on prebreeding migration earlier, fast explorers departed later from the wintering grounds compared to slow explorers. However, this was only the case for individuals subjected to restricted food access throughout the experiment (i.e. 6-h and 12-h treatments), which probably reflects natural conditions more compared to the unrestricted food access treatment. Individuals with unlimited food access (i.e. 24-h treatment) showed no personality-dependent differences in migration timing. Rather than a direct effect of personality on migration timing, personality affects migration strategies indirectly, most probably via how individuals cope with recuperating from food restrictions or fuel in the field. Based on the results of the current study, additional analyses using the same dataset (Lameris *et al.* 2025) and previous work on the tagging system (see 'Tracking migratory departure' in Methods), we consider it unlikely that our findings are driven by feeding treatments, handling, tag mass or other methodological factors, and instead reflect true inter-individual differences in personality.

Previous analyses by Lameris *et al.* (2025) showed that food access influences the rate of migration preparation (i.e. plumage moult and mass deposition) in Red Knots, and that faster-preparing individuals (i.e. those from the 24-h treatment) departed earlier from the Wadden Sea. Generalising the effect of treatments, however, may hide personality-driven differences in birds' ability to find food in a social setting (Roncoroni *et al.* 2024). For example, slow explorers locate food more quickly than fast explorers when foraging in a group, whereas fast explorers are quicker at finding food when foraging alone (Roncoroni *et al.* 2024). We hypothesise that our experimentally constrained access to food may have affected fast explorers more severely, which could explain why fast explorers gained relatively less (or lost more) body mass compared to slow

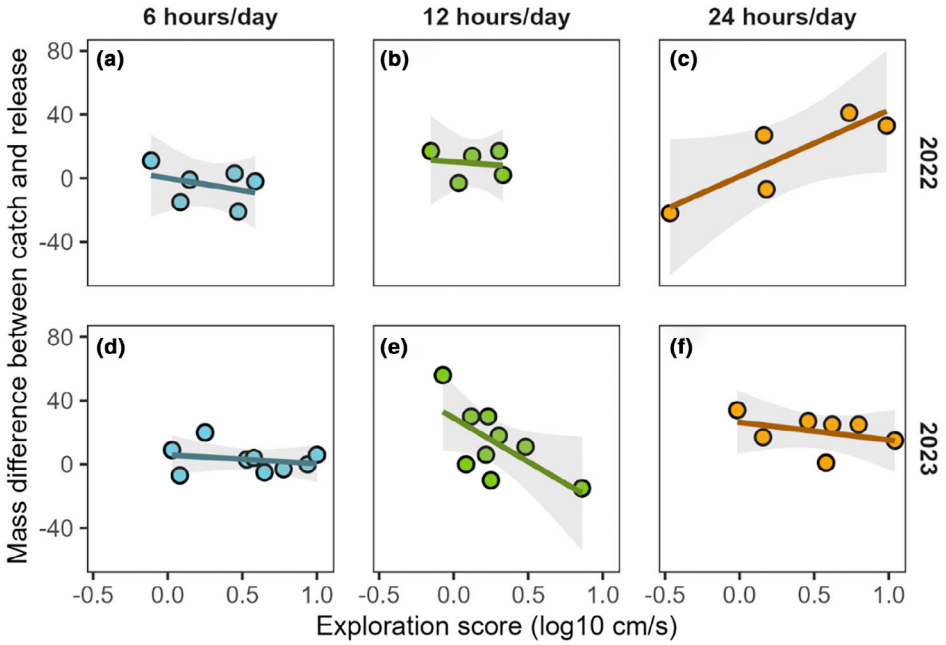

Figure 2. The relationship between exploration scores and the change in total body mass between the moment of catch and release back in the wild after the experiment, shown per treatment and year, including a standard linear regression.

explorers when food was restricted (i.e. 6- and 12-h treatments; Fig. 2; Table 2c). This also suggests that exploration speed affects migration timing only indirectly. The personality-related patterns observed in departure date indicate that the interaction between personality and treatment extends into the period between release and migratory departure.

Personality traits among individuals of the same species can constitute different pace-of-life characteristics (Réale *et al.* 2010). More explorative and bolder individuals across species are, for instance, expected to have a faster pace of life and a higher energy expenditure (Careau *et al.* 2008). Red Knots presumably use different foraging strategies and prey choices to offset personality-related higher energy expenditures (Ersoy *et al.* 2022), amounting to equal survival (Bijleveld *et al.* 2014). Nevertheless, we show that these strategies may become insufficient when fast-exploring Red Knots need to store energy reserves for their migratory flights after being subjected to restricted food access. We consider three possible non-mutually exclusive scenarios to explain the delayed departures of fast-exploring Red Knots: (1) fast explorers recover more slowly from experimental manipulation and handling; (2) all Red Knots depart with a similar body mass, but fast explorers recuperate more slowly after food restrictions; and (3) fast explorers depart with a larger body mass compared to slow explorers.

In scenario 1, fast-exploring Red Knots depart later because they are probably less adaptable and recover more slowly from experimental handling (Ersoy *et al.* 2022), especially after periods of increased competition in the food-restricted treatments (Roncoroni *et al.* 2024; Fig. 2). Upon release, fast explorers are expected to struggle to readapt and regain condition in the wild, requiring more time for fuelling and migratory departure. In scenario 2, the foraging techniques and high-energy diet of fast-exploring individuals (Ersoy *et al.* 2022) may be sufficient to sustain their high-paced lifestyle and prepare for migration when food is plentiful without competition (Roncoroni *et al.* 2024), but become insufficient after being deprived of food while also having to ensure timely migratory departure. In scenario 3, fast explorers depart with a higher body mass to compensate for reduced refuelling opportunities en route, possibly due to a lower abundance of their preferred energy-rich prey (Ersoy *et al.* 2022) or increased competition (Roncoroni *et al.* 2024). Although this may be partly compensated for by making more stopovers during migration (Chan 2021, Vervoort *et al.* 2022), fast explorers probably still require more time to reach a higher body mass at the wintering sites—an effect that may be exacerbated by their presumed higher pace of life and energy expenditure.

Despite previous studies using tags of similar and larger mass not observing any abnormal behaviour (Bijleveld *et al.* 2016, Oudman *et al.* 2018), tags can still affect animal behaviour including migration timing (e.g. Lameris *et al.* 2018b). Even if this were the case in our study, the relative differences in departure timing between animals differing in exploration speed and treatment would still support our conclusions. We included the rate of body mass deposition as the key weight-related factor in our models, as it links food availability to changes in departure date based on previous analyses by Lameris *et al.* (2025). Based on the treatment-dependent differences in departure timing across the exploratory range (Fig. 1a–f) and the overall importance of body mass in departure timing among migratory birds (Bridge *et al.* 2010, Cooper *et al.* 2015), body mass upon departure is probably a better, but currently unknown predictor of personality-dependent variation in migration timing. Future studies would benefit from estimating body mass at departure to better understand the critical period between release and departure, and confirm which of the previously described scenarios may be true.

Studies in animal ecology often report varying levels of (between-)individual variation that cannot be fully explained by standing phenotypic and genetic variation (Bolnick *et al.* 2011) or environmental factors (Gobbens *et al.* 2024), but may instead reflect personality differences (Wolf & Weissing 2012). Furthermore, the presence and selection of personality traits within a population can change in response to fluctuating environmental conditions (Dingemanse *et al.* 2004) and may be subject to multiple stressors (Grunst & Grunst 2024). Our results demonstrate that even when personality traits are present within a population, their effects may only become apparent under specific conditions—such as limited food availability—and could therefore be overlooked if such variation is not considered. This becomes especially relevant when personality affects individual-based phenological events, such as arrival at the breeding grounds and subsequently reproductive success of these individuals. Ultimately, our study confirms the importance of including, or at least accounting for, personality traits in studies of animal behaviour and movement ecology, particularly in contexts involving fluctuating or limiting environmental conditions.

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AUTHOR CONTRIBUTIONS

Tohar Tal: Conceptualization; investigation; writing – original draft; writing – review and editing; visualization; formal analysis. **Allert I. Bijleveld:** Conceptualization; writing – review and editing; supervision. **Karein van Bijssum:** Investigation; writing – original draft; writing – review and editing. **Hidde Kressin:** Investigation; writing – review and editing. **Thomas K. Lameris:** Conceptualization; funding acquisition; investigation; writing – original draft; writing – review and editing; data curation.

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ETHICS

Permits to catch, handle, tag, test and keep Red Knots were given to the NIOZ by Dutch law and regulation under protocol number (AVD8020020171505: 6 September 2021, till 1 August 2022 and AVD802002022 15943: 28 July 2022, till 27 July 2027).

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

ETHICAL NOTE

None.

DATA AVAILABILITY STATEMENT

The data and code that support the findings of this study are openly available via Figshare at https://figshare.com/s/f2cd1b688191f23e60cc.

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