Increased yearling weight as a proportion of 21-month weight was associated with increased milk production in dairy heifers

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Supplementary Table 1. Number (n) of Holstein-Friesian (F), Holstein-Friesian crossbred (FX), Holstein-Friesian-Jersey crossbred (FJ), Jersey crossbred (JX) and Jersey (J) heifers that contributed their first lacation only, first and second lactations only or first, second and third lactations to their accumulated three-year-yield. For further explanation of the dataset refer to Figure 1 in the manuscript.

Breed group and LWT category	1st, 2nd and 3rd lactations	1st and 2nd lactations only	1st lactation only	Total
F				
Tiny	1,808	762	516	**3,086**
Small	2,105	722	489	**3,316**
Average	2,132	628	550	**3,310**
Big	2,117	658	535	**3,310**
Huge	2,108	676	576	**3,360**
FX				
Tiny	2,675	980	616	**4,271**
Small	2,888	793	671	**4,352**
Average	3,072	828	677	**4,577**
Big	3,059	776	656	**4,491**
Huge	3,060	707	734	**4,501**
FJ				
Tiny	1,949	639	405	**2,993**
Small	1,933	539	398	**2,870**
Average	2,104	542	385	**3,031**
Big	2,196	517	459	**3,172**
Huge	2,125	506	457	**3,088**
JX				
Tiny	1,179	342	271	**1,792**
Small	1,154	311	242	**1,707**
Average	1,193	255	248	**1,696**
Big	1,176	332	236	**1,744**
Huge	1,147	326	260	**1,733**
J				
Tiny	790	262	178	**1,230**

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Small	762	200	175	**1,137**
Average	809	207	135	**1,151**
Big	716	161	151	**1,028**
Huge	594	167	126	**887**
Total	**44,851**	**12,836**	**10,146**	**67,833**

Heifers were categorised into quintiles as tiny, small, average, big or huge at 21 months of age within each breed group

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Supplementary Table 2. Predicted absolute growth rate (AGR; ±SEM) from three to 21 months of age for Holstein-Friesian (F) heifers that were tiny, small, average, big or huge at 21 months of age and were 45%, 55% or 65% of their 21-month live weight (LWT) at 12 months of age (LWT(12/21)%).

	3-6 mo	6-9 mo	9-12 mo	12-15 mo	15-18 mo	18-21 mo
Tiny						
45%	$0.47^a \pm 0.003$	$0.22^a \pm 0.002$	$0.40^a \pm 0.002$	$0.73^c \pm 0.002$	$0.94^c \pm 0.001$	$0.73^c \pm 0.003$
55%	$0.58^b \pm 0.002$	$0.39^b \pm 0.001$	$0.49^b \pm 0.002$	$0.67^b \pm 0.002$	$0.75^b \pm 0.001$	$0.53^b \pm 0.002$
65%	$0.68^c \pm 0.002$	$0.56^c \pm 0.002$	$0.57^c \pm 0.002$	$0.61^a \pm 0.002$	$0.57^a \pm 0.001$	$0.33^a \pm 0.002$
Small						
45%	$0.51^a \pm 0.003$	$0.22^a \pm 0.002$	$0.43^a \pm 0.002$	$0.81^c \pm 0.002$	$1.02^c \pm 0.001$	$0.75^c \pm 0.003$
55%	$0.63^b \pm 0.002$	$0.41^b \pm 0.001$	$0.53^b \pm 0.002$	$0.75^b \pm 0.002$	$0.83^b \pm 0.001$	$0.53^b \pm 0.002$
65%	$0.75^c \pm 0.003$	$0.60^c \pm 0.002$	$0.63^c \pm 0.002$	$0.69^a \pm 0.002$	$0.63^a \pm 0.001$	$0.30^a \pm 0.002$
Average						
45%	$0.53^a \pm 0.003$	$0.22^a \pm 0.002$	$0.45^a \pm 0.002$	$0.86^c \pm 0.002$	$1.08^c \pm 0.001$	$0.75^c \pm 0.003$
55%	$0.66^b \pm 0.002$	$0.42^b \pm 0.001$	$0.55^b \pm 0.002$	$0.79^b \pm 0.002$	$0.87^b \pm 0.001$	$0.52^b \pm 0.002$
65%	$0.79^c \pm 0.003$	$0.61^c \pm 0.002$	$0.65^c \pm 0.002$	$0.73^a \pm 0.002$	$0.67^a \pm 0.001$	$0.29^a \pm 0.003$
Big						
45%	$0.56^a \pm 0.003$	$0.22^a \pm 0.002$	$0.47^a \pm 0.002$	$0.91^c \pm 0.002$	$1.13^c \pm 0.001$	$0.75^c \pm 0.003$
55%	$0.69^b \pm 0.002$	$0.43^b \pm 0.001$	$0.58^b \pm 0.002$	$0.84^b \pm 0.002$	$0.92^b \pm 0.001$	$0.51^b \pm 0.002$
65%	$0.83^c \pm 0.003$	$0.63^c \pm 0.002$	$0.68^c \pm 0.002$	$0.77^a \pm 0.002$	$0.71^a \pm 0.001$	$0.28^a \pm 0.003$
Huge						
45%	$0.61^a \pm 0.003$	$0.24^a \pm 0.002$	$0.51^a \pm 0.003$	$0.98^c \pm 0.002$	$1.22^c \pm 0.001$	$0.80^c \pm 0.003$
55%	$0.75^b \pm 0.002$	$0.46^b \pm 0.002$	$0.62^b \pm 0.002$	$0.90^b \pm 0.002$	$0.99^b \pm 0.001$	$0.54^b \pm 0.002$
65%	$0.89^c \pm 0.003$	$0.67^c \pm 0.002$	$0.73^c \pm 0.002$	$0.83^a \pm 0.002$	$0.76^a \pm 0.001$	$0.27^a \pm 0.003$

[a-c] Values within a column and LWT category with different superscripts differ at the 95% confidence interval.
Heifers were categorised into quintiles as tiny, small, average, big or huge at 21 months of age within each breed group

Supplementary Table 3. Predicted absolute growth rate (AGR; ±SEM) from 3 to 21 months of age for Holstein-Friesian crossbred (FX) heifers that were tiny, small, average, big or huge at 21 months of age and were 45%, 55% or 65% of their 21-month live weight (LWT) at 12 months of age (LWT(12/21)%).

	3-6 mo	6-9 mo	9-12 mo	12-15 mo	15-18 mo	18-21 mo
Tiny						
45%	$0.45^a \pm 0.003$	$0.22^a \pm 0.002$	$0.39^a \pm 0.002$	$0.70^c \pm 0.002$	$0.90^c \pm 0.001$	$0.74^c \pm 0.003$
55%	$0.56^b \pm 0.002$	$0.38^b \pm 0.001$	$0.47^b \pm 0.002$	$0.64^b \pm 0.002$	$0.73^b \pm 0.001$	$0.53^b \pm 0.002$
65%	$0.67^c \pm 0.002$	$0.55^c \pm 0.002$	$0.55^c \pm 0.002$	$0.59^a \pm 0.002$	$0.55^a \pm 0.001$	$0.33^a \pm 0.002$
Small						
45%	$0.49^a \pm 0.003$	$0.23^a \pm 0.002$	$0.42^a \pm 0.002$	$0.77^c \pm 0.002$	$0.98^c \pm 0.001$	$0.76^c \pm 0.003$
55%	$0.62^b \pm 0.002$	$0.40^b \pm 0.001$	$0.51^b \pm 0.002$	$0.71^b \pm 0.002$	$0.79^b \pm 0.001$	$0.54^b \pm 0.002$
65%	$0.74^c \pm 0.002$	$0.58^c \pm 0.002$	$0.60^c \pm 0.002$	$0.65^a \pm 0.002$	$0.60^a \pm 0.001$	$0.32^a \pm 0.002$
Average						
45%	$0.52^a \pm 0.003$	$0.22^a \pm 0.002$	$0.43^a \pm 0.002$	$0.81^c \pm 0.002$	$1.04^c \pm 0.001$	$0.76^c \pm 0.003$
55%	$0.65^b \pm 0.002$	$0.41^b \pm 0.001$	$0.53^b \pm 0.002$	$0.75^b \pm 0.002$	$0.84^b \pm 0.001$	$0.53^b \pm 0.002$
65%	$0.77^c \pm 0.002$	$0.60^c \pm 0.002$	$0.63^c \pm 0.002$	$0.69^a \pm 0.002$	$0.64^a \pm 0.001$	$0.31^a \pm 0.002$
Big						
45%	$0.55^a \pm 0.003$	$0.22^a \pm 0.002$	$0.45^a \pm 0.002$	$0.87^c \pm 0.002$	$1.09^c \pm 0.001$	$0.75^c \pm 0.003$
55%	$0.68^b \pm 0.002$	$0.42^b \pm 0.001$	$0.55^b \pm 0.002$	$0.80^b \pm 0.002$	$0.88^b \pm 0.001$	$0.52^b \pm 0.002$
65%	$0.81^c \pm 0.003$	$0.62^c \pm 0.002$	$0.65^c \pm 0.002$	$0.73^a \pm 0.002$	$0.67^a \pm 0.001$	$0.30^a \pm 0.002$
Huge						
45%	$0.60^a \pm 0.003$	$0.24^a \pm 0.002$	$0.49^a \pm 0.002$	$0.94^c \pm 0.002$	$1.17^c \pm 0.001$	$0.78^c \pm 0.003$
55%	$0.74^b \pm 0.002$	$0.45^b \pm 0.001$	$0.59^b \pm 0.002$	$0.86^b \pm 0.002$	$0.95^b \pm 0.001$	$0.54^b \pm 0.002$
65%	$0.87^c \pm 0.003$	$0.65^c \pm 0.002$	$0.70^c \pm 0.002$	$0.79^a \pm 0.002$	$0.72^a \pm 0.001$	$0.30^a \pm 0.003$

[a-c] Values within a column and LWT category with different superscripts differ at the 95% confidence interval.
Heifers were categorised into quintiles as tiny, small, average, big or huge at 21 months of age within each breed group

Supplementary Table 4. Predicted absolute growth rate (AGR; ±SEM) from 3 to 21 months of age for Holstein-Friesian-Jersey crossbred (FJ) heifers that were tiny, small, average, big or huge at 21 months of age and were 45%, 55% or 65% of their 21-month live weight (LWT) at 12 months of age (LWT(12/21)%).

	3-6 mo	6-9 mo	9-12 mo	12-15 mo	15-18 mo	18-21 mo
Tiny						
45%	$0.44^a \pm 0.003$	$0.22^a \pm 0.002$	$0.38^a \pm 0.002$	$0.67^c \pm 0.002$	$0.87^c \pm 0.001$	$0.74^c \pm 0.003$
55%	$0.54^b \pm 0.002$	$0.38^b \pm 0.001$	$0.46^b \pm 0.002$	$0.62^b \pm 0.002$	$0.70^b \pm 0.001$	$0.53^b \pm 0.002$
65%	$0.65^c \pm 0.002$	$0.53^c \pm 0.002$	$0.54^c \pm 0.002$	$0.56^a \pm 0.002$	$0.53^a \pm 0.001$	$0.33^a \pm 0.002$
Small						
45%	$0.48^a \pm 0.003$	$0.22^a \pm 0.002$	$0.40^a \pm 0.002$	$0.73^c \pm 0.002$	$0.94^c \pm 0.001$	$0.76^c \pm 0.003$
55%	$0.60^b \pm 0.002$	$0.40^b \pm 0.001$	$0.49^b \pm 0.002$	$0.68^b \pm 0.002$	$0.76^b \pm 0.001$	$0.54^b \pm 0.002$
65%	$0.72^c \pm 0.003$	$0.57^c \pm 0.002$	$0.58^c \pm 0.002$	$0.62^a \pm 0.002$	$0.58^a \pm 0.001$	$0.33^a \pm 0.003$
Average						
45%	$0.51^a \pm 0.003$	$0.23^a \pm 0.002$	$0.42^a \pm 0.002$	$0.78^c \pm 0.002$	$0.99^c \pm 0.001$	$0.76^c \pm 0.003$
55%	$0.63^b \pm 0.002$	$0.41^b \pm 0.001$	$0.51^b \pm 0.002$	$0.72^b \pm 0.002$	$0.80^b \pm 0.001$	$0.54^b \pm 0.002$
65%	$0.75^c \pm 0.003$	$0.59^c \pm 0.002$	$0.60^c \pm 0.002$	$0.66^a \pm 0.002$	$0.61^a \pm 0.001$	$0.33^a \pm 0.003$
Big						
45%	$0.53^a \pm 0.003$	$0.23^a \pm 0.002$	$0.44^a \pm 0.002$	$0.82^c \pm 0.002$	$1.05^c \pm 0.001$	$0.76^c \pm 0.003$
55%	$0.66^b \pm 0.002$	$0.42^b \pm 0.001$	$0.53^b \pm 0.002$	$0.76^b \pm 0.002$	$0.85^b \pm 0.001$	$0.53^b \pm 0.002$
65%	$0.78^c \pm 0.003$	$0.61^c \pm 0.002$	$0.63^c \pm 0.002$	$0.70^a \pm 0.002$	$0.64^a \pm 0.001$	$0.31^a \pm 0.003$
Huge						
45%	$0.58^a \pm 0.003$	$0.23^a \pm 0.002$	$0.47^a \pm 0.002$	$0.90^c \pm 0.002$	$1.13^c \pm 0.001$	$0.78^c \pm 0.003$
55%	$0.71^b \pm 0.002$	$0.44^b \pm 0.001$	$0.57^b \pm 0.002$	$0.82^b \pm 0.002$	$0.91^b \pm 0.001$	$0.54^b \pm 0.002$
65%	$0.84^c \pm 0.003$	$0.64^c \pm 0.002$	$0.67^c \pm 0.002$	$0.75^a \pm 0.002$	$0.69^a \pm 0.001$	$0.31^a \pm 0.003$

[a-c] Values within a column and LWT category with different superscripts differ at the 95% confidence interval.
Heifers were categorised into quintiles as tiny, small, average, big or huge at 21 months of age within each breed group

Supplementary Table 5. Predicted absolute growth rate (AGR; ±SEM) from 3 to 21 months of age for Jersey crossbred (JX) heifers that were tiny, small, average, big or huge at 21 months of age and were 45%, 55% or 65% of their 21-month live weight (LWT) at 12 months of age (LWT(21/12)%).

	3-6 mo	6-9 mo	9-12 mo	12-15 mo	15-18 mo	18-21 mo
Tiny						
45%	$0.42^a \pm 0.004$	$0.22^a \pm 0.002$	$0.37^a \pm 0.003$	$0.65^c \pm 0.003$	$0.84^c \pm 0.002$	$0.72^c \pm 0.004$
55%	$0.52^b \pm 0.003$	$0.37^b \pm 0.002$	$0.44^b \pm 0.002$	$0.59^b \pm 0.002$	$0.67^b \pm 0.001$	$0.53^b \pm 0.002$
65%	$0.62^c \pm 0.003$	$0.52^c \pm 0.002$	$0.52^c \pm 0.002$	$0.54^a \pm 0.002$	$0.50^a \pm 0.001$	$0.34^a \pm 0.003$
Small						
45%	$0.46^a \pm 0.003$	$0.22^a \pm 0.002$	$0.38^a \pm 0.003$	$0.69^c \pm 0.003$	$0.90^c \pm 0.002$	$0.76^c \pm 0.003$
55%	$0.58^b \pm 0.002$	$0.39^b \pm 0.002$	$0.47^b \pm 0.002$	$0.64^b \pm 0.002$	$0.73^b \pm 0.001$	$0.55^b \pm 0.002$
65%	$0.69^c \pm 0.003$	$0.56^c \pm 0.002$	$0.56^c \pm 0.002$	$0.60^a \pm 0.002$	$0.56^a \pm 0.001$	$0.33^a \pm 0.003$
Average						
45%	$0.49^a \pm 0.003$	$0.23^a \pm 0.002$	$0.41^a \pm 0.003$	$0.74^c \pm 0.002$	$0.95^c \pm 0.001$	$0.76^c \pm 0.003$
55%	$0.61^b \pm 0.002$	$0.40^b \pm 0.002$	$0.50^b \pm 0.002$	$0.68^b \pm 0.002$	$0.77^b \pm 0.001$	$0.55^b \pm 0.002$
65%	$0.73^c \pm 0.003$	$0.58^c \pm 0.002$	$0.59^c \pm 0.002$	$0.63^a \pm 0.002$	$0.58^a \pm 0.001$	$0.33^a \pm 0.003$
Big						
45%	$0.52^a \pm 0.003$	$0.23^a \pm 0.002$	$0.43^a \pm 0.003$	$0.79^c \pm 0.002$	$1.00^c \pm 0.001$	$0.76^c \pm 0.003$
55%	$0.64^b \pm 0.002$	$0.41^b \pm 0.002$	$0.52^b \pm 0.002$	$0.73^b \pm 0.002$	$0.81^b \pm 0.001$	$0.54^b \pm 0.002$
65%	$0.76^c \pm 0.003$	$0.60^c \pm 0.002$	$0.61^c \pm 0.002$	$0.67^a \pm 0.002$	$0.62^a \pm 0.001$	$0.32^a \pm 0.003$
Huge						
45%	$0.57^a \pm 0.003$	$0.24^a \pm 0.002$	$0.46^a \pm 0.003$	$0.86^c \pm 0.002$	$1.09^c \pm 0.001$	$0.78^c \pm 0.003$
55%	$0.70^b \pm 0.002$	$0.43^b \pm 0.002$	$0.55^b \pm 0.002$	$0.79^b \pm 0.002$	$0.88^b \pm 0.001$	$0.54^b \pm 0.002$
65%	$0.82^c \pm 0.003$	$0.63^c \pm 0.002$	$0.65^c \pm 0.003$	$0.72^a \pm 0.002$	$0.67^a \pm 0.001$	$0.31^a \pm 0.003$

[a-c] Values within a column and LWT category with different superscripts differ at the 95% confidence interval.
Heifers were categorised into quintiles as tiny, small, average, big or huge at 21 months of age within each breed group

Supplementary Table 6. Predicted absolute growth rate (AGR; ±SEM) from 3 to 21 months of age for Jersey (J) heifers that were tiny, small, average, big or huge at 21 months of age and were 45%, 55% or 65% of their 21-month live weight (LWT) at 12 months of age (LWT(12/21)%).

	3-6 mo	6-9 mo	9-12 mo	12-15 mo	15-18 mo	18-21 mo
Tiny						
45%	0.38[a] ± 0.005	0.22[a] ± 0.004	0.35[a] ± 0.004	0.60[c] ± 0.004	0.77[c] ± 0.003	0.69[c] ± 0.005
55%	0.48[b] ± 0.003	0.36[b] ± 0.002	0.42[b] ± 0.003	0.54[b] ± 0.002	0.61[b] ± 0.001	0.52[b] ± 0.003
65%	0.58[c] ± 0.003	0.50[c] ± 0.002	0.48[c] ± 0.003	0.48[a] ± 0.003	0.45[a] ± 0.002	0.35[a] ± 0.003
Small						
45%	0.43[a] ± 0.005	0.22[a] ± 0.003	0.36[a] ± 0.004	0.63[c] ± 0.004	0.83[c] ± 0.002	0.75[c] ± 0.005
55%	0.53[b] ± 0.003	0.38[b] ± 0.002	0.44[b] ± 0.002	0.58[b] ± 0.002	0.66[b] ± 0.001	0.55[b] ± 0.003
65%	0.63[c] ± 0.004	0.54[c] ± 0.002	0.53[c] ± 0.003	0.54[a] ± 0.003	0.50[a] ± 0.002	0.35[a] ± 0.004
Average						
45%	0.46[a] ± 0.005	0.23[a] ± 0.003	0.38[a] ± 0.004	0.67[c] ± 0.004	0.87[c] ± 0.002	0.76[c] ± 0.005
55%	0.57[b] ± 0.003	0.39[b] ± 0.002	0.46[b] ± 0.002	0.62[b] ± 0.002	0.70[b] ± 0.001	0.55[b] ± 0.003
65%	0.68[c] ± 0.004	0.55[c] ± 0.002	0.54[c] ± 0.003	0.57[a] ± 0.003	0.53[a] ± 0.002	0.35[a] ± 0.004
Big						
45%	0.49[a] ± 0.004	0.23[a] ± 0.003	0.39[a] ± 0.003	0.71[c] ± 0.003	0.93[c] ± 0.002	0.77[c] ± 0.004
55%	0.60[b] ± 0.003	0.40[b] ± 0.002	0.48[b] ± 0.002	0.66[b] ± 0.002	0.74[b] ± 0.001	0.56[b] ± 0.003
65%	0.72[c] ± 0.004	0.58[c] ± 0.003	0.57[c] ± 0.003	0.60[a] ± 0.003	0.56[a] ± 0.002	0.35[a] ± 0.004
Huge						
45%	0.53[a] ± 0.004	0.23[a] ± 0.003	0.43[a] ± 0.003	0.80[c] ± 0.003	1.02[c] ± 0.002	0.77[c] ± 0.004
55%	0.65[b] ± 0.003	0.42[b] ± 0.002	0.52[b] ± 0.002	0.73[b] ± 0.002	0.81[b] ± 0.001	0.55[b] ± 0.003
65%	0.77[c] ± 0.004	0.61[c] ± 0.003	0.61[c] ± 0.003	0.66[a] ± 0.003	0.61[a] ± 0.002	0.34[a] ± 0.004

[a-c] Values within a column and LWT category with different superscripts differ at the 95% confidence interval.
Heifers were categorised into quintiles as tiny, small, average, big or huge at 21 months of age within each breed group